THE American Journal OF Gastroenterology

VOL. 35, NO. 4 APRIL, 1961

Replacement of the Entire Esophagus for Malignant or Benign Stenosis

A Combined Medical and Surgical Approach to the Treatment of Reflux Esophagitis

Postgastrectomy Syndromes

The Relationship of Viral Hepatitis to Cirrhosis of the Liver

Large Bowel Obstruction

Twenty-sixth Annual Convention
Cleveland, Ohio
22, 23, 24, 25 October 1961

Official Publication
AMERICAN COLLEGE
OF GASTROENTEROLOGY

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In certain patients—particularly the elderly and debilitated—there have been occasional reports of ataxia and drowsiness. While these effects can be avoided in almost all patients by proper dosage adjustment, ataxia and drowsiness have occasionally been observed at the lower dosage ranges. In addition, there have been isolated instances of minor skin rashes, nausea and constipation, as well as reports of both increased and decreased libido. Such side effects have been infrequent and have been readily controlled with reduction of dosage. The necessity of discontinuing therapy because of undesirable effects has been very rare.

PRECAUTIONS—In elderly, debilitated patients, it is important to limit the dosage to the smallest effective amount to preclude the development of ataxia or oversedation (not more than 10 mg per day initially, to be increased gradually as needed and tolerated). As is true of all CNS-acting drugs, until the correct maintenance dosage is established, patients receiving Librium should be advised against possibly hazardous procedures requiring complete mental alertness or physical coordination. While there has been no clinical evidence of complications following the concomitant administration of Librium and other psychotropic agents, in general such combined therapy is not recommended. If combination therapy seems indicated, careful consideration should be given to the pharmacology of the agents to be employed with Librium—particularly when the known potentiating compounds such as the MAO inhibitors and phenothiazines are to be used. The usual precautions in treating patients with impaired renal or hepatic function should be observed.

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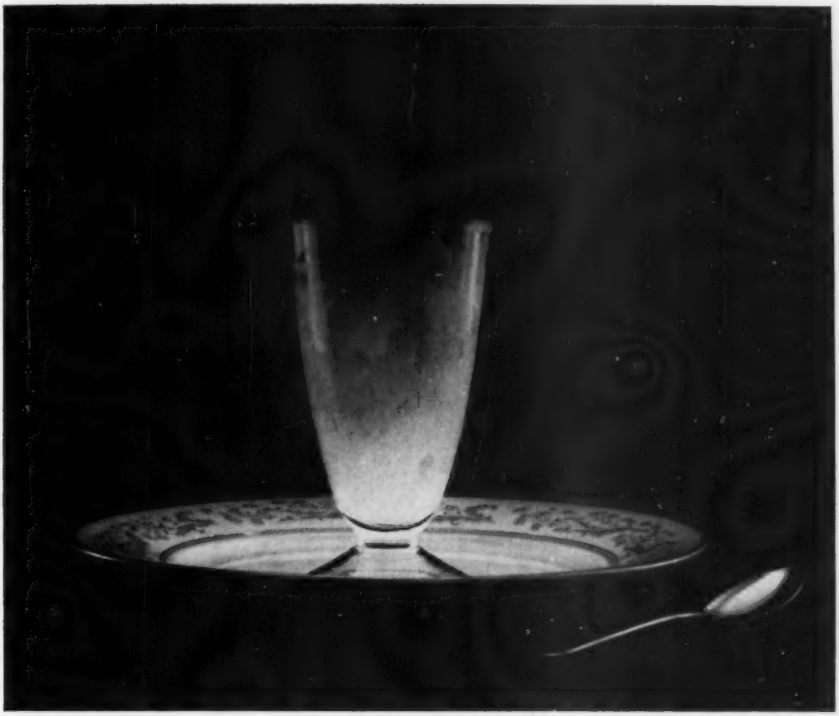

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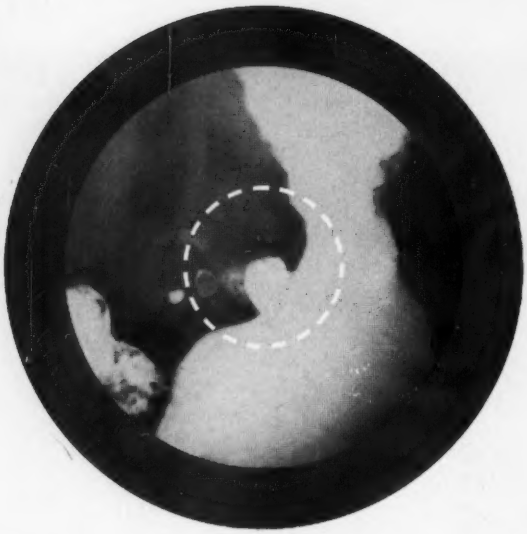

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The Pioneer Journal of Gastroenterology, Proctology and Allied Subjects in the United States and Canada

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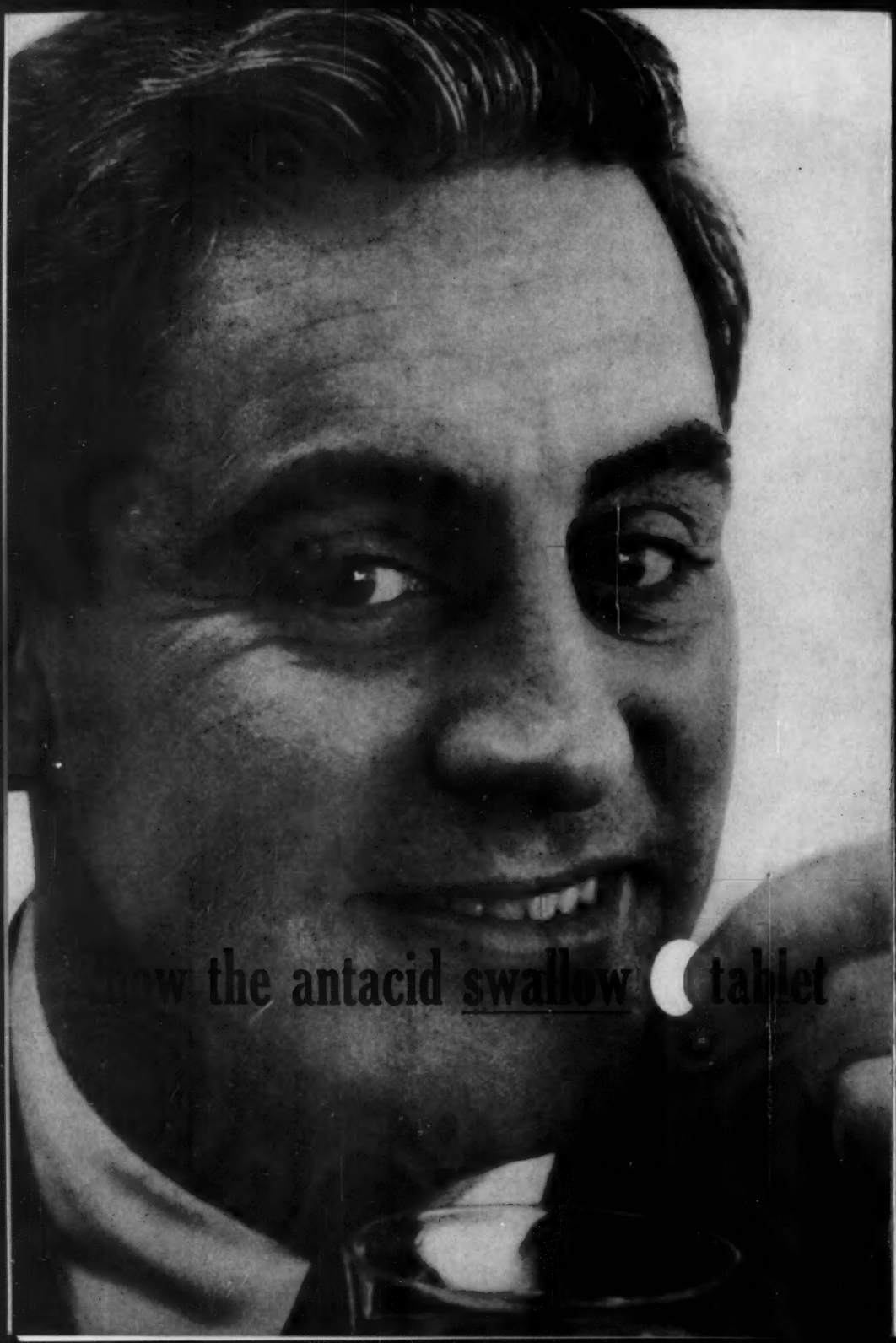
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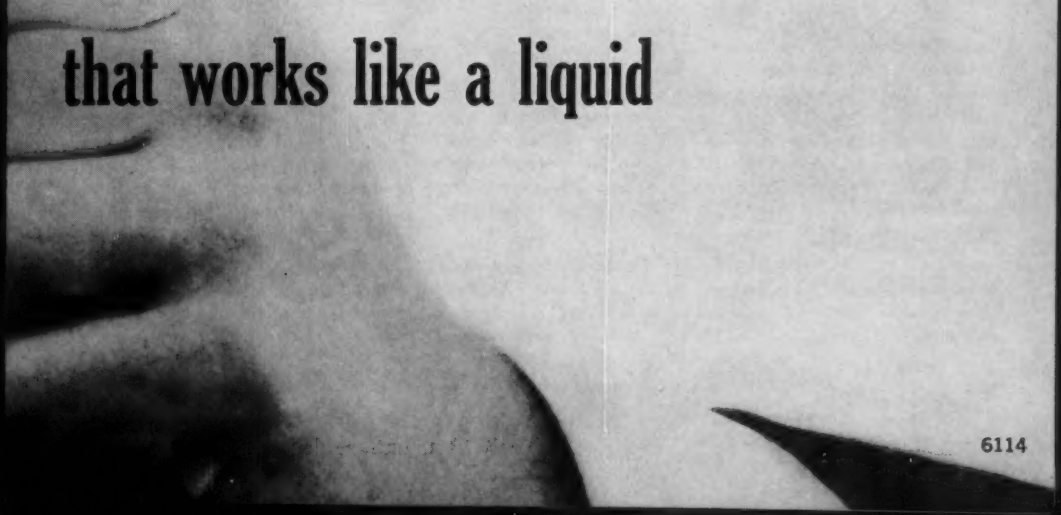

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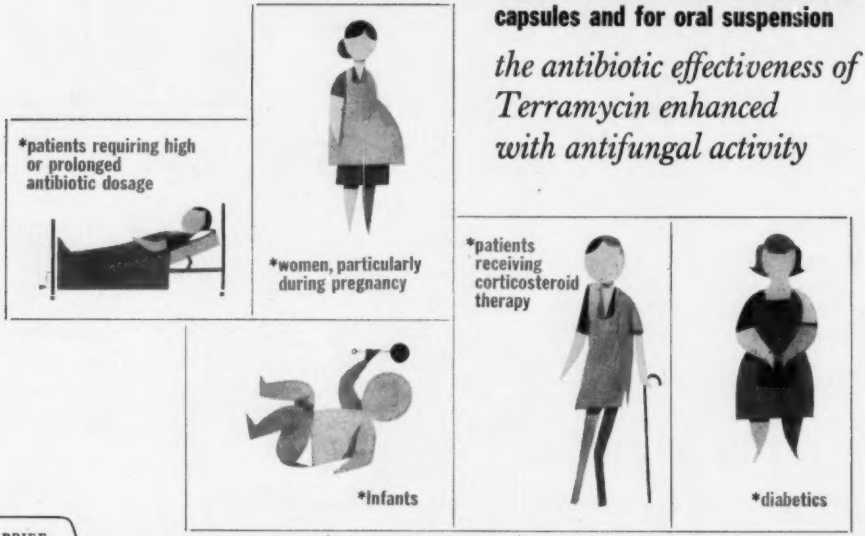

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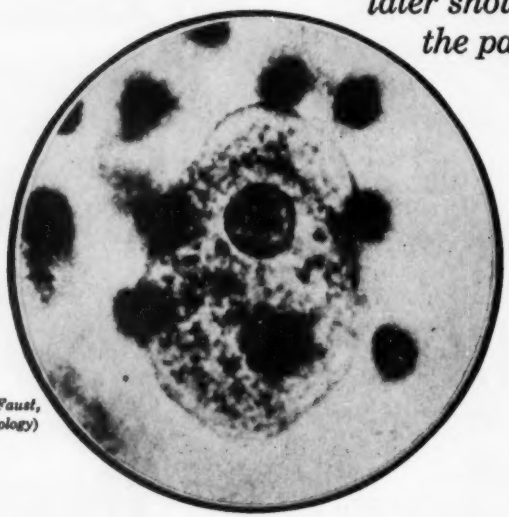

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1. Frye, W.W., and Lampert, R.: Treatment of Asymptomatic Endamoeba histolytica Carriers with a Formulation of Bacitracin-Methylene Disalicylate and Iodochlorhydroxyquin (Anameba). Am. J. Gastroenterol. **34**:429-432 (Oct.), 1960.

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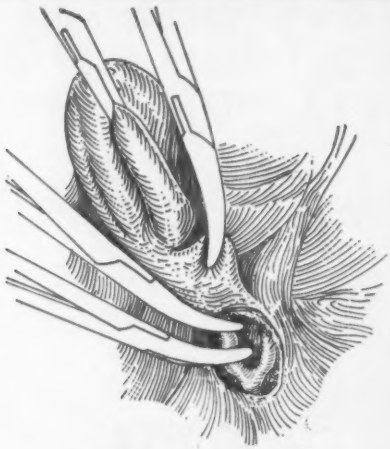

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Source: Farris, J. M., and Smith, G. K.: M. Clin. North America *43*:1133 (July) 1959.

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VOLUME 35 APRIL, 1961 NUMBER 4

REPLACEMENT OF THE ENTIRE ESOPHAGUS FOR MALIGNANT OR BENIGN STENOSIS*

HENRY J. HEIMLICH, M.D., F.A.C.S.†

New Rochelle, N. Y.

INTRODUCTION

In previous reports, the author has described the construction of a reversed gastric tube as a means of replacing the entire esophagus[1,2,3]. As of this writing, the reversed gastric tube operation has been used in 18 patients. The results of this series will be reported herein.

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2. Benign stricture of the thoracic esophagus.
3. Benign obstruction in the hypopharynx and cervical esophagus.
4. Carcinoma of the cervical esophagus.

The reversed gastric tube has also been used successfully by the author to replace an esophagus destroyed by peptic esophagitis. In addition, a two-year old child with a congenital stricture of the esophagus operated by Sieber and a four-year old child with esophageal varices due to portal cirrhosis operated by Sanders were successfully treated by this method[4,5].

OPERATIVE TECHNIC

The abdomen is entered through a left subcostal incision. The tail of the pancreas is freed from the underlying tissue, and the splenic vessels are ligated

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in the hilus of the spleen, which is removed. Blood passing through the splenic vessels is now directed into the left gastroepiploic arteries, which supply the greater curvature of the stomach and must be preserved.

A cut is made in the greater curvature of the stomach through the anterior and posterior walls of the antrum, approximately 4 cm. proximal to the pylorus. The incision is extended parallel to the greater curvature at a distance of 2 cm. through both walls of the stomach to a point high on the fundus. The incised edges of the anterior and posterior walls are sutured together thereby forming the gastric tube and reconstituting the stomach (Fig. 1).

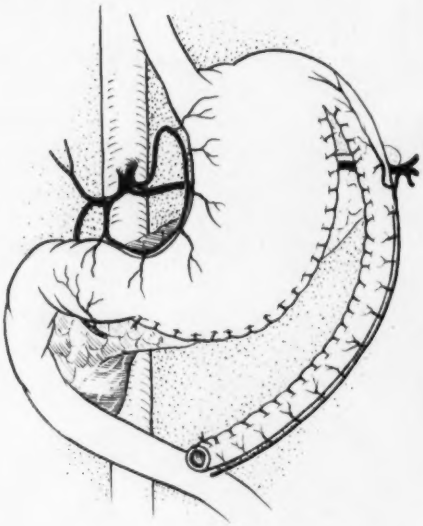

Fig. 1—See text.

A cervical incision is made anterior and parallel to the left sternomastoid muscle, extending upward from the suprasternal notch. A subcutaneous tunnel is created in the avascular plane anterior to the sternum, extending from the xiphoid to the incision in the neck. The gastric tube is drawn through the tunnel, accompanied by its vascular supply, the left gastroepiploic vessels. The blood supply accompanying the gastric tube is long enough to reach the neck, owing to the fact that the freed tail of the pancreas extends to the costal margin and is accompanied by the splenic vessels.

The cervical esophagus is dissected free and transected approximately 2 cm. distal to the pharynx. The distal end of the esophagus is closed and allowed to retract into the thorax. The reversed gastric tube, wrapped with the gastrocolic omentum, is anastomosed to the proximal esophagus (Fig. 2).

In two of the patients to be presented, the gastric tube was attached considerably higher than the cervical esophagus. In Case 3, the tube was anastomosed end-to-side to the hypopharynx above the cricopharyngeus and, in Case 4, it was anastomosed at the level of the pyriform fossa in the hypopharynx.

A gastrostomy tube is used to decompress the stomach for two or three days after the operation. Thereafter, the patient is fed through the gastrostomy for four to seven days until adequate nourishment can be taken by mouth.

If the esophageal obstruction is due to a benign lesion or inoperable carcinoma, the nonfunctioning diseased esophagus is left *in situ* in the chest. When a resectable carcinoma is present, radioactive cobalt therapy is directed to the tumor, following which a right thoracotomy is performed and the entire esophagus is resected.

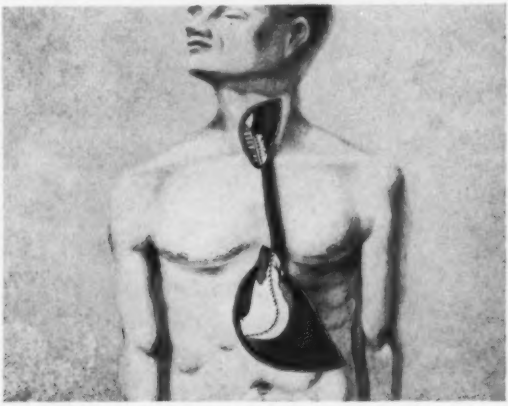

Fig. 2—See text.

Case Reports

Case 1, Carcinoma of the upper third of the thoracic esophagus:—B.V., a 35-year old woman, had a squamous cell carcinoma of the upper third of the esophagus diagnosed by esophagoscopic biopsy. A reversed gastric tube was constructed for this patient on 12 September 1957, at Montefiore Hospital. Two weeks later, right thoracotomy was performed at which time a carcinoma was found in the esophagus at the level of the aortic arch. The entire esophagus was removed and the opening into the cardia was closed by inversion. Microscopically, all nodes removed were free of tumor.

The patient was given fluids by mouth on the fourth postoperative day, and was advanced to a regular diet by the eighth postoperative day (Figs. 3a and 3b). She gained weight, continued to eat normally, and returned to work. She

remained well until two years after operation, at which time she was readmitted with evidence of widespread metastatic carcinoma. The patient was able to eat a regular diet until the last few days prior to her demise, on 26 October 1959.

Comment:—This patient had a carcinoma of the thoracic esophagus at the level of the aortic arch. Resection of the entire esophagus was performed in the hope of obtaining a cure. Watson et al have demonstrated that cancer cells can be present in the submucosa of the esophagus, 8 centimeters from the palpable tumor[6]. It is important, therefore, that total esophagectomy be performed in

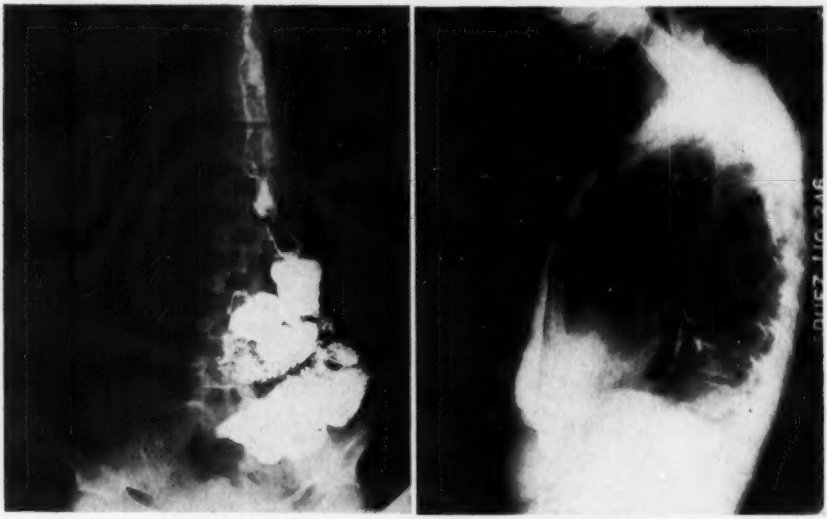

Fig. 3a Fig. 3b

Figs. 3a and 3b—Case 1. Postoperative barium swallow. The gastric tube is seen emptying into the residual stomach. In the lateral film, the subcutaneous, antesternal position of the gastric tube is evident.

treating carcinoma. Despite the fact that the carcinoma recurred, this patient enjoyed two years of effective palliation.

The abdominal and cervical incisions that are required in making the reversed gastric tube enable the surgeon to explore for the presence of metastatic lesions in the abdomen and neck. If a metastasis is found, the carcinoma has already spread beyond the possibility of cure. The gastric tube is then completed and a thoracotomy need not be performed as resection of the esophagus is not indicated. Effective palliation has been accomplished as the patient can eat normally by means of the esophageal replacement by the reversed gastric tube. Radiotherapy and chemotherapy can then be given to deter the growth of the carcinoma.

Case 2, Lye stricture in the cervical esophagus and in the thoracic esophagus at the level of the aortic arch:—J.G., a 45-year old female, had been unable to swallow liquids or solids since drinking lye in a suicide attempt on 7 May 1956. A gastrostomy had been performed at the time of injury, one and one-half years prior to her admission to Metropolitan Hospital.

An esophagram demonstrated an almost complete obstruction of the thoracic esophagus and a second constriction in the cervical esophagus (Figs. 4a and 4b).

At operation, 31 January 1958, a reversed gastric tube was constructed and anastomosed to the cervical esophagus above the highest stricture. Although the

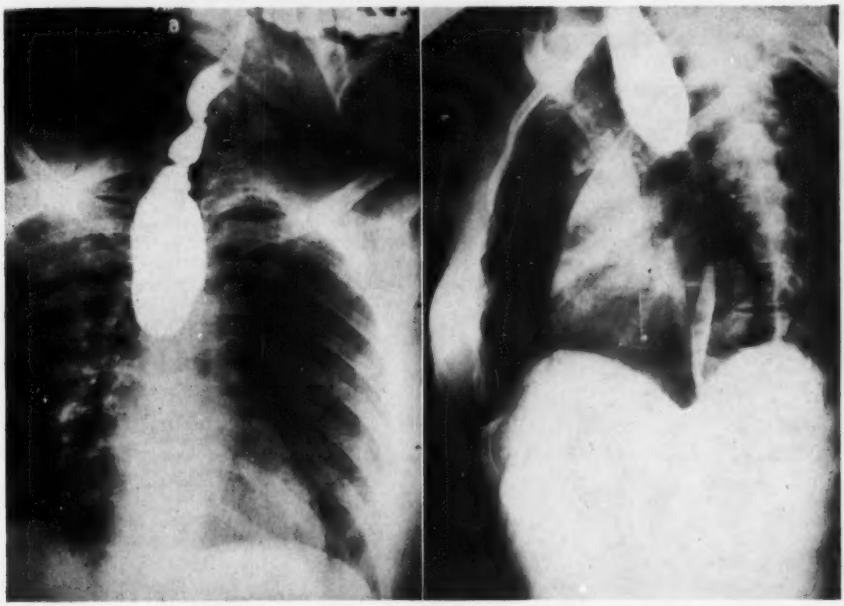

Fig. 4a Fig. 4b

Figs. 4a and 4b—Case 2. Preoperative barium swallow. Two partial lye strictures in the cervical esophagus, and an almost complete stenosis of the thoracic esophagus are evident.

stomach was markedly thickened and somewhat fibrotic, there was no difficulty in creating a gastric tube of adequate length to reach to the neck.

The patient has continued to eat a regular diet without difficulty to the present time, two and one-half years after operation (Figs. 5a, 5b and 5c).

Comment:—In this patient there was a partial obstruction in the cervical esophagus and an almost complete obstruction at the level of the aortic arch.

Multiple strictures commonly occur as a result of swallowing lye. Cure depends on restoring gastrointestinal continuity from a point higher than the most proximal stricture, as was accomplished in this patient. This case demonstrates that a thoracotomy need not be performed when this operation is utilized in treating benign strictures.

There is no evidence of peptic esophagitis in this patient, two and one-half years after operation. The reversed gastric tube operation was originally conceived as a means of overcoming the problem of peptic esophagitis by virtue of the fact that the antrum, which does not secrete acid, is anastomosed to the proximal esophagus.

Case 3, Twenty-nine years of complete pharyngoesophageal obstruction resulting from lye stricture at the level of the cricopharyngeus:—V.D., a 52-year old

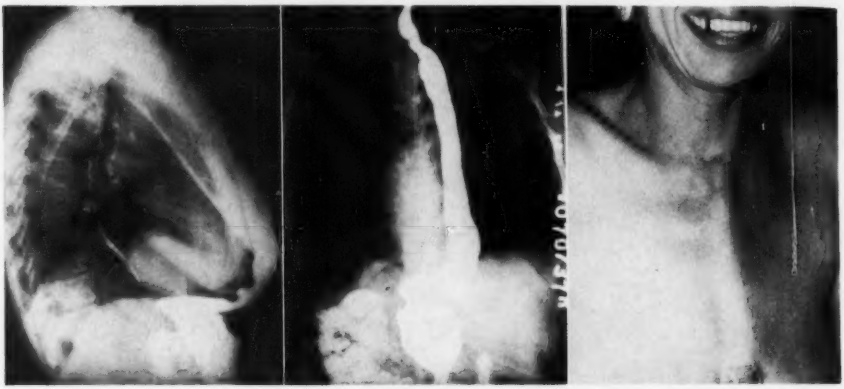

Fig. 5a Fig. 5b Fig. 5c

Figs. 5a and 5b—Case 2. Postoperative barium swallow. The gastric tube is demonstrated and is seen to be anastomosed to the cervical esophagus, higher than the most proximal stricture.
Fig. 5c—Case 2. The gastric tube is barely visible on the chest wall.

female, was admitted to Montefiore Hospital on 20 July 1959. Twenty-nine years prior to admission, in 1930, she had accidentally swallowed lye and was admitted to a hospital where an emergency Stamm gastrostomy was performed. Despite the fact that esophageal bougienage was performed several times at that hospital over a period of 2 years, the esophagus became completely obstructed. At that time, the Stamm gastrostomy was not functioning satisfactorily and a second gastrostomy of the Janeway type was performed at a second hospital.

The patient subsequently married and had two children, both by Cesarian section. She has been in good health except for lobar pneumonia in 1952 and repeated respiratory infections.

For 29 years she maintained her nutrition by chewing food and expectorating it into a funnel attached to a large gastrostomy tube. She was able to maintain excellent nutrition in this manner and, on admission, weighed 176 pounds.

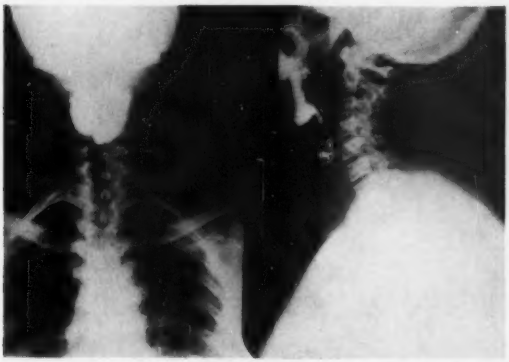

Fig. 6a—Case 3. Preoperative barium swallow. There is complete obstruction in the pharynx at the level of the cricopharyngeus.

If, however, food reached the back of her throat she would choke and gag due to aspiration. Saliva pooled in the back of her throat causing her to expectorate at least once every hour. The main reason that the patient desired an operation

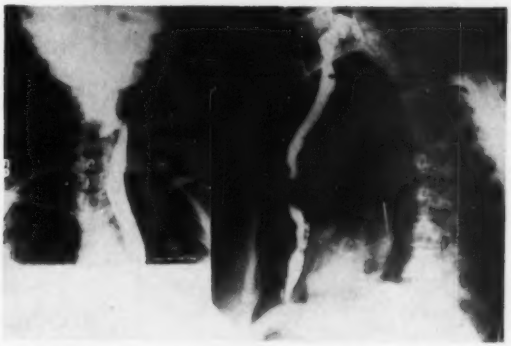

Fig. 6b—Case 3. Postoperative barium swallow. The gastric tube is anastomosed end-to-side to the hypopharynx, proximal to the cricopharyngeus. The gap seen in the gastric tube is due to swallowed air.

to restore the function of swallowing was due to the fact that her abnormal manner of eating made it impossible for her to eat with her family and friends.

Esophagoscopy:—(Dr. Max Som, 21 July 1959) Complete stenosis due to stricture at the level of the cricopharyngeus.

Preoperative roentgenograms:—(23 July 1959) Radiopaque dye by mouth shows a complete obstruction at the level of the cricopharyngeus (Fig. 6a).

Operation was deferred at the request of the Department of Gastroenterology in order that physiological tests could be carried out.

A reversed gastric tube procedure was performed on 22 October 1959. Despite the fact that the stomach was markedly shrunken due to the scarring from the lye and the two gastrostomy procedures, it was possible to bring the tube as high as the hypopharynx. Owing to the scarring in the cervical esophagus, it was necessary to do an end-to-side anastomosis between the gastric tube and the hypopharynx. The patient had a benign postoperative course and was given her first swallow consisting of tea and Jello two weeks after operation. The diet was gradually increased over the next two weeks at which time she was discharged from the hospital. She has remained well and asymptomatic to date and eats a regular diet in a normal manner (Fig. 6b).

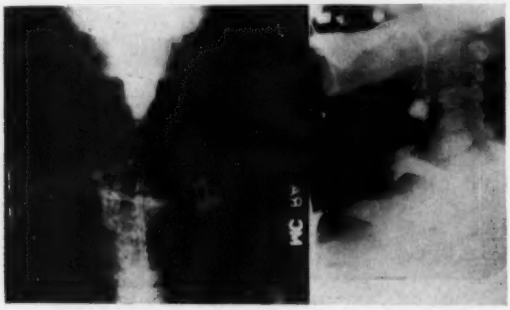

Fig. 7a—Case 4. Preoperative barium swallow. There is complete obstruction in the hypopharynx. A permanent tracheostomy is present. A feeding tube is seen in the distal esophagus.

Comment:—It was possible to make the reversed gastric tube sufficiently long to reach to the hypopharynx despite the fact that the stomach was smaller than average due to the scarring by lye and to the two gastrostomies. In every instance, the gastric tube and its vascular supply have been of more than adequate length to replace the entire esophagus.

In previous cases an end-to-end anastomosis was performed between the gastric tube and the cervical esophagus. This patient demonstrates that normal swallowing will still result when the gastric tube is anastomosed end-to-side to the hypopharynx.

Restoration of swallowing in this patient after 29 years of gastrostomy feedings, was, as one would expect, a gratifying experience to all concerned.

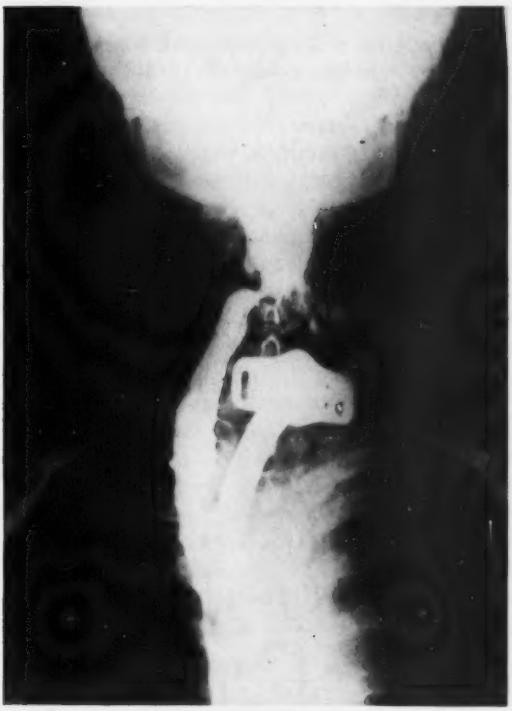

Fig. 7b

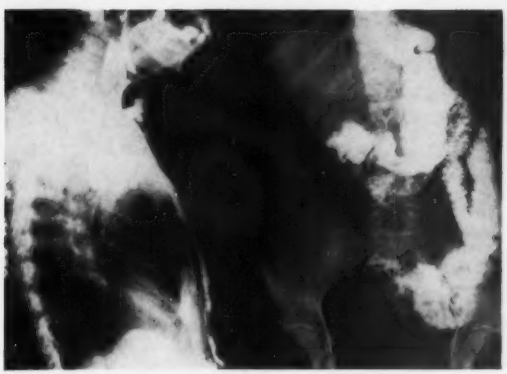

Fig. 7c

Figs. 7b and 7c—Case 4. Postoperative barium swallow. The gastric tube is anastomosed to the hypopharynx at the level of the pyriform fossa. The tube is seen in the subcutaneous, antesternal position. The gastric tube entering into the large residual stomach is demonstrated.

Case 4, Carcinoma of the cervical esophagus. Replacement of the esophagus after resection of the larynx, the cervical esophagus, and a portion of the pharynx:—Prior to her admission to Montefiore Hospital, J.M., a 62-year old female, had had the following surgical procedures performed in a hospital in another city: In August, 1958, the cervical esophagus was excised for postcricoid carcinoma, and a Teflon graft prosthesis was inserted to replace the cervical esophagus. Within a few weeks, the prosthesis became a source of infection and had to be removed. At this time, a laryngectomy was performed to prevent death by aspiration, a permanent tracheostomy was made, and a distal cervical esophagostomy created through which a Levin tube was inserted for feeding.

The patient was admitted to Montefiore Hospital on 5 June 1959, one year after the procedures described above had been performed. Barium swallow roentgenograms revealed complete pharyngeal obstruction (Fig. 7a). A reversed gastric tube procedure was performed on 1 July 1959. Due to the high level of obstruction, it was necessary to anastomose this tube to the pyriform fossa in the hypopharynx. The patient was able to eat soft foods thereafter, but could not swallow solids owing to the fact that the anastomosis had been made too narrow. She was readmitted to Montefiore, and on 12 November 1959, a reanastomosis was performed which was easily accomplished as the anastomosis lay directly beneath the subcutaneous tissue of the neck (Figs. 7b and 7c). The patient was discharged able to eat all foods. She continued to eat a normal diet until she expired on 30 May 1960, due to recurrent carcinoma.

Comment:—This patient had had several operations involving the neck, mediastinum, and chest wall; the subcutaneous tunnel was, therefore, the only feasible route for bringing an esophageal substitute to the neck. Other indications for bringing the tube to the neck subcutaneously will be discussed in the conclusions. The height to which the tube can be brought is again illustrated by the anastomosis of the gastric tube to the hypopharynx at the pyriform fossa.

Following resection of the cervical esophagus, an organ or prosthesis is frequently used to bridge the two cut ends of the cervical esophagus in order to restore deglutition. When such a method is used, it is necessary to preserve a substantial portion of the distal esophagus in order to perform the esophageal reconstruction; therefore an inadequate resection of the cancerous esophagus may result. On the other hand, if a reversed gastric tube is to be used to replace the entire esophagus, the distal esophagus can be sacrificed, and a more adequate cancer operation performed.

Results and Conclusions

Table I gives the results of the 18 reversed gastric tube procedures performed by the author to date. The case reports illustrate the fact that the entire esophagus, from the pyriform fossa in the hypopharynx to the abdomen, can be

replaced by this method. The entire esophagus must be replaced when an adequate resection for carcinoma of the thoracic or cervical esophagus is performed, as well as in the case where a benign obstruction is present in the cervical esophagus or pharynx.

All 13 carcinoma patients have succumbed to the disease from 3 months to 2 years following operation (early operative cases were selected because of their advanced metastatic cancer). The 9 who had successful reversed gastric tube

TABLE I

THE REVERSED GASTRIC TUBE OPERATION

Total cases operated	18
Malignant	13
Benign	5
Results	
Successful:—Patients able to eat a regular diet	13
Malignant	9
Benign	4
Unsuccessful:—(All carcinoma) Unable to eat; survived with gastrostomy	3
Persistent fistula at esophagogastric anastomosis in neck	2
Successful gastric tube; after second-stage esophageal resection, fistula developed at cardia	1
Operative mortality	2
Case:—Recurrent cancer after cobalt therapy. The first gastric tube to be attempted.	
Cause of death:—Gastric tube constructed without preserving vascular supply. Tube necrosed	1
Case:—Esophageal obstruction due to compression by enlarged heart.	
Cause of death:—Pulmonary embolus on fifth postoperative day after benign course	1

operations were able to eat a regular diet up until the time of death. Three advanced carcinoma cases were considered failures as the patients were not able to eat a regular diet postoperatively. Two of these patients developed a salivary fistula at the esophagogastric anastomosis and survived with gastrostomy feedings. The third case had a successful gastric tube but developed a fistula at the cardia when esophagectomy was performed at a second stage.

There were two postoperative deaths. One was the first patient in whom the reversed gastric tube operation was attempted. The operation was performed in order to overcome esophageal obstruction caused by carcinoma of the upper

thoracic esophagus which had recurred following a course of cobalt therapy. No attempt was made to preserve the gastroepiploic blood supply when forming the tube in this patient and the tube necrosed. The second patient considered to be an operative mortality had compression of the esophagus due to a very large heart. He did extremely well and was eating normally, but died suddenly in the hospital of a pulmonary embolus.

Four patients who had benign esophageal strictures are completely well, one as long as 2½ years postoperatively. There has been no clinical evidence of peptic esophagitis in these patients. In addition, none of the carcinoma patients, including one who succumbed two years after operation, showed gross or microscopic evidence of peptic esophagitis. Thus far, these cases support the original conception of the author that peptic esophagitis will not develop because the antrum, which does not secrete acid, forms that part of the gastric tube that is anastomosed to the cervical esophagus or pharynx.

The subcutaneous position of the gastric tube diminishes the possibility of morbidity and mortality with this operation. It is unlikely that the poor risk cases first selected for the operation would have survived an intrathoracic procedure. Certainly, those patients who developed a salivary fistula at the esophagogastric anastomosis would have had a much more serious complication and very likely would not have survived if the leak had occurred in the chest or mediastinum. It is of interest from a cosmetic standpoint that the gastric tube is barely visible on the chest wall after several months.

Summary

The results in 18 consecutive patients in whom a gastric tube has been used as a replacement for the entire esophagus have been presented. Four cases have been described in detail which illustrate the use of this method of total esophageal replacement in the following conditions:

1. Carcinoma of the thoracic esophagus.
2. Lye stricture of the cervical and thoracic esophagus.
3. Lye stricture of the pharynx causing complete obstruction and rendering the patient unable to swallow for 29 years.
4. Carcinoma of the cervical esophagus.

Following the reversed gastric tube operation, these patients have been able to eat a regular diet in a normal manner.

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Discussion

Dr. William E. Neville (Cleveland, Ohio):—I want to compliment Dr. Heimlich on a very nice presentation and a beautiful movie which graphically depicts the difficult problems inherent in reconstruction of the esophagus for malignant and benign stenosis.

My associate Dr. George Clowes and I have approached this problem in a different manner. We have utilized segments of the colon to replace the esophagus following resection. (Reconstruction of esophagus with segments of the colon—J. Thoracic Surg. **35**:2, 1958.)

Our dissatisfaction with displacement of the stomach into the chest following esophageal resection led us to investigate the use of the colon to replace all or part of the esophagus. To date we have utilized the colon in 52 patients to reconstruct the esophagus in benign and malignant disease.

Our over all approach to this problem has been based upon the extent of the lesion and the existing pathology.

(Slide) In patients in whom the entire esophagus is either atretic, cicatricially stenosed, or carcinoma is deemed nonresectable, the colon has been transplanted into the neck through an anterior mediastinal tunnel. In these cases, the entire colon from the cecum to the splenic flexure is mobilized through an abdominal incision. As a rule the ileocecal junction is divided and the opening in the cecum closed. On occasions we have left a segment of ileum attached to the cecum if it is felt that the right colon does not have sufficient length to reach the neck. Simultaneously the esophagus is exposed in the neck. A tunnel is created in the anterior mediastinum by blunt dissection from below and above just posterior to the periosteum of the sternum. The proximal end of the colon is transposed through the tunnel into the neck, and anastomosed to the cervical esophagus. The distal end of the colon is transected beyond the middle colic vessels. This end of the bowel is sutured to the anterior wall of the stomach. Thus, this entire segment of bowel is suspended upon a vascular pedicle of the middle colic artery and vein. An ileocolostomy completes the operation.

(Slide) In resection carcinomas of the esophagus above the aortic arch we have utilized a right thoracic and upper midline abdominal incision. Concom-

itantly the esophagus is removed and the colon mobilized by employing two operating teams. The proximal end of the colon is passed into the chest anterior to the hilum of the lung. The anastomoses are accomplished in the manner described previously. A tube gastrostomy is done to obviate the necessity for a Levin tube and to feed the patient until he is able to eat normally.

(Slide) This is a baby who had a tracheoesophageal fistula with atresia. The impossibility of a primary anastomosis necessitated a cervical esophagostomy following ligation of the fistula. The atretic distal esophagus was resected. A gastrostomy for feeding purposes followed closure of the right chest.

At the age of a year this child had an anterior mediastinal colon transplant. (Colon replacement of the esophagus in children for congenital and acquired disease—J. Thoracic Surg. **40**:507, 1960.)

He is now six and one-half years of age, is doing well, eating in a normal manner and gaining weight commensurate with his growth.

(Slide) This depicts an individual with an extensive squamous cell carcinoma involving the middle third of the esophagus. Because of the extent of the lesion, pulmonary emphysema and her chronological age of 77 years, we elected to by-pass the carcinoma by transposing an ileocolic segment through an anterior mediastinal tunnel. As you can see, she can swallow in a normal manner and is undergoing radiotherapy for her carcinoma.

(Slide) As you can see, this child had a total stricture of the esophagus. At the first operation his swallowing ability was restored by virtue of an anterior mediastinal colon transplant by passing the entire intrathoracic esophagus. One year later the stenosed esophagus was removed through a right thoracic incision. He is an active healthy boy four years following his implant.

(Slide) Here is another boy with a stricture of the lower end of the esophagus resultant from ingestion of muriatic acid. A segment of transverse colon was interpolated between the esophagus and stomach following resection of the stricture. It is now four and one-half years since this procedure and he is having no difficulties.

We feel that the colon does offer certain advantages. It has an excellent blood supply and because of the numerous marginal vessels long segments can be mobilized without endangering its circulation. It is readily available and has sufficient length to reach the hypopharynx in case the entire esophagus is resected. This allows the stomach to remain in its normal position below the diaphragm and helps to account for the normal nutrition in these patients. Lastly, the colonic mucosa is apparently resistant to acid-peptic digestion. This is attested to by our own experimental data of others plus clinical observations of individuals over a period of several years.

Again, I want to compliment Dr. Heimlich on an excellent presentation. I think that the operation depicted by him does offer distinct advantages and should be added to our armamentarium of surgical procedures which are worthwhile to the patient following benign stenosis or surgical ablation of his esophagus.

Dr. Henry J. Heimlich (New Rochelle, N. Y.):—I want to thank Dr. Neville for his kind remarks. I believe it is very important that as many methods as possible be available to the surgeon who is confronted with this problem (of reconstruction of the esophagus). Recently, I received a letter from a surgeon who had been using the colon for esophageal replacement until he found an infant with a malrotation and esophageal atresia. He therefore proceeded to use my procedure and wrote to tell me that he had been successful with it. Similarly, there will perhaps be cases where the stomach has been resected, and a method other than the one I have presented will have to be used.

The use of the colon has become very popular recently. I myself feel somewhat hesitant about using the colon as it does not seem to be physiologically sound. A recent article by Dr. Nardi of Massachusetts General Hospital in *Annals of Surgery* presents a patient with a massive ulceration of the colon just above the anastomosis to the stomach. In reviewing the literature, he pointed out the fact that the exposure of the intestine to hydrochloric acid results in more severe ulceration the lower down in the intestinal tract one goes.

I would like to say in regard to palliative procedures—and I feel very strongly about this—I used my operation in inoperable carcinomas originally because the procedure was being evaluated. I do not believe, however, that any major procedure should be performed if it can be determined in advance that a carcinoma of the esophagus is inoperable. There are many minor operative procedures available, such as insertion of plastic tubes through the carcinoma, which restore swallowing without subjecting these patients to the discomforts and risks of a major procedure.

AN ESOPHAGEAL INTUBATOR–ITS USE IN ESOPHAGOSCOPY*

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The performance of esophagoscopy has been a procedure requiring thorough training and skill not alone as an art in instrumentation but in the avoidance of injury to the patient with its attendant consequences. The esophagus being a delicate organ and surrounded by important structures is one which withstands trauma and infection poorly; the slightest abrasion may presage calamity. Its inaccessibility to facile instrumentation arises from anatomic considerations which has to be coped with in each procedure. A straight rigid tube has been relied upon to effect such an examination through inherent natural curves and impediments, the foremost of these being at the tonically closed cricopharyngeus muscle which has to be negotiated before entrance into the esophageal lumen is attained.

Even in the most experienced hands a not unusual circumstance is presented wherein despite every attempt at manipulation a blind area in the distal pharynx is encountered with no visible opening through which the instrument can be inserted. Undue force ill-directed at this time accounts for the grievous results which so often ensue. Accordingly a lumen finder may have to be resorted to, over which the esophagoscope is passed to attain the desired entrance. The utilization of this guide most often serves its purpose. Here and there in a recalcitrant highly tense subject, it too presents its problems.

In an attempt to facilitate the technic of esophagoscopy and at the same time to render it less hazardous, flexible tube esophagoscopy was introduced in 1947 with a wide acceptance, which in part was shared by other subsequent instruments all of which were designated for the same purpose. The need and practicability of this new technic has been amply attested to. Not only have patients more willingly subjected themselves when confronted by the need for this operation, but the clinician himself has more readily acquiesced in its suggested performance. The incidence of injury has been negligible and the entire process so smooth and simple as to leave no unpleasant memories on the part of the patient. Understandably, lesions just under the cricopharyngeus muscle were not suited to the use of flexible esophagoscopes. Moreover, operating room decor for its performance was not required.

In keeping with the desirability of facility and safety in this form of endoscopy, the manifold problems referred to have been amply met by the construction of a plastic tube whose flexibility is slightly more than that of an

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ordinary Ewald stomach tube and which can readily be inserted through the pharyngeal opening with the ease and certainty of the letter, to a level just below the cricopharyngeus. Then by directed movement of the head in the customary manner, the rigid instrument is placed into this tube without any difficulty, and forced downward as required. This soft tapered plastic tube can produce no more damage than a rubber gastric tube, either while being introduced or *in situ*. It encases the rigid esophagoscope and precludes any damage whatsoever from forceful effects of its hard tip. The structural qualities of the wall of this plastic intubator affords a protective tunnel for the instrument, so that at no time before passage through the cricopharyngeal opening does the metallic instrument itself come in contact with the delicate structures of this region. The intubator being 10 inches long remains in place during the rest of the performance and at its completion is removed together with the esophagoscope which it houses.

The preliminary medication generally in use for esophagoscopy together with local pharyngeal anesthesia is carried out in conformity with usual practice.

Fig. 1

The intubator may be introduced with the patient reclining on his back or in the side position depending on the operator's choice.

Conclusion

A plastic intubator has been devised which in practice has afforded a simple means to facilitate the performance of an esophagoscopy, irrespective of the type of instrument used for this purpose. It is easily manipulated, can be passed through the cricopharyngeal opening without any difficulty whatsoever and acts as an open avenue for the actual introduction of the esophagoscope, simultaneously protecting the surrounding structures from injury. It simplifies the procedure and affords safety to the patient.

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Discussion

Dr. Jay H. Davidson (Philadelphia, Pa.):—Not having been afforded the opportunity of reading this paper in advance my comments must be extemporaneous.

I think Dr. Boros is to be congratulated for a number of reasons, but primarily he is to be congratulated on pointing out two things.

One, that this procedure is very properly the procedure to be performed by the gastroenterologist rather than the otorhinolaryngologist as in the past.

And secondarily he's to be congratulated in his efforts to seek a means of improving the technic of the procedure as far as safety and facility is concerned.

I have no experience with this particular type of introduction; my own personal experience is with the blind introduction utilizing an instrument with a very flexible obturator.

I've been fortunate, I presume, in not having had any difficulty with the pinch-cock so described. I think, however, Dr. Boros quite properly placed one other bit of emphasis and I would like to once more make a comment here and that is in terms of the relationship with the patient.

A properly prepared patient who anticipates what you are going to do and is relaxed and comfortable in your presence will certainly prevent the incidence of any untoward result. Here, I think, is the most important thing that we can talk about because no matter what technic any of us acquire—and we may acquire variable technics—if we have a good relationship with the patient in advance of the procedure we will almost always accomplish the procedure without any undue difficulty.

Once again I want to congratulate Dr. Boros on his continued efforts of improving this procedure.

PHYSIOLOGICAL AND CLINICAL ASPECTS OF PEPTIC ESOPHAGITIS*

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The esophagus propels swallowed food and saliva from the oropharynx into the stomach and is, therefore, not only vital to continuing life but also, due to the frequency of its use, a source of prominent symptoms when attacked by any pathologic process. Normally, the progress of the bolus in its caudad direction does not produce symptoms. On the other hand, reverse flow, vomiting or regurgitation, is apt to be symptomatic and demonstrable reflux from the stomach into the distal esophagus bears grave import.

The mechanics, whether single or multiple, preventing return of the gastric contents are not clearly understood[1]. Many theories have been offered but only four, all somewhat unsatisfactory at best, have been widely acceptable. 1. An intrinsic (anatomic) esophageal sphincter. A circumferential muscular sphincter considered capable of constricting the esophageal lumen by contraction has been described by some anatomists, notably Lerche[2]. Support can be derived from animal experiments: in the dog stimulation of the peripheral section of the severed vagus produces a constriction in the distal esophagus[3]. Further, but inferential support can be obtained from fluoroscopic observations of an interruption of the flow of barium by an area of constriction at the distal esophagus, terminated by gradual, smooth, zonal relaxation. An intrinsic sphincter, however, has failed to attain general acceptance because of the failure to consistently and convincingly demonstrate such a muscular structure, either by dissection of cadavers[4] or by observations at laparotomy[5].

2. An extrinsic (diaphragmatic) sphincter. The diaphragmatic foramen through which the esophagus passes is formed by division of the right crus of the diaphragm. It has been postulated that contraction of this musculature results in a pinch-cock mechanism on the distal esophagus. Again support has been inferential, such as Joannides'[3] experiments, in which an investigating finger was inserted through a gastrotomy wound into the lower esophagus and rhythmic contractions, synchronous with respirations, were palpated. Also of inferential support are the fluoroscopic observations that cardioesophageal regurgitation may best be demonstrated during deep inspiration[6]. Recent measurements[1], however, indicate that this reflux can be attributed to the positive intra-abdominal and negative intrathoracic (and, therefore, intraesophageal) pressure

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during inspiration. Furthermore, the failure of diaphragmatic paralysis, however induced, to alter the influence of respiration on the esophagus has weakened acceptance of the theory of an effective extrinsic sphincter[7].

3. A flap-valve mechanism. The esophagus normally traverses the diaphragm at an acute angle, so that pressure conceivably acts to pinch closed the esophageal lumen within the diaphragm. Experimental data in animals and cadavers seem to corroborate this conclusion. But alterations in the angle, produced by surgical intervention[8] or by the institution of pneumoperitoneum[9], have not been accompanied by a consistent regurgitation of gastric contents.

4. The concept of a "physiologic sphincter" has been more directly supported by the meticulous studies reported from Code's laboratory[10]. Sensitive electronic devices, which measure intraluminal pressures with the least introduction of artifacts, have demonstrated a zone of high pressure in the distal esophagus, greater than that in the stomach distally. In the resting state this pressure zone interferes with return from the stomach. Following deglutition this physiologic sphincter relaxed, allowing passage of the bolus, then returned to its previous level with the following esophageal peristaltic contraction.

Considerable interest has been aroused by the publication of these observations and ample confirmation has been obtained by independent workers[11,12]. Further confirmation may be derived from the observation of alterations in this sphincter pressure zone in association with the heartburn of pregnancy[13] or following cardiomyotomy[14]. Nonetheless, its exact role in disease states, notably gastroesophageal regurgitation, remains to be clarified. In Grossman's laboratory alterations in this physiologic sphincter were not demonstrable in patients with well established esophageal regurgitation and esophagitis[12].

Whatever the mechanism or mechanisms may be that prevent regurgitant flow of gastric juices into the esophagus, a characteristic chain of events, known as peptic esophagitis, follows in many patients with demonstrable reflux. Its predominant symptom is a sense of burning, almost consistently referred to the retrosternal area, occasionally into the neck, jaw, or shoulders. The burning is either precipitated or intensified by food. At first it may follow only thermally hot or spicy foods, later it follows even bland foods and is especially intense after irritating substances; it may be intensified even by empty swallows. With further deterioration the burning increases in severity and frequency, so that the patient may be asymptomatic only as long as he avoids eating. Otherwise the burning is persistent, perhaps fluctuating in intensity and increasing especially when aided by gravity as during level recumbency or bending over, or following maneuvers which increase intraabdominal pressure, such as straining, lifting, coughing, or wearing a tight corset.

Many times the progress of the disease appears to be inexorable with progressive intensification and the seeming inevitable development of one or more

complications. The most characteristic complication is the development of cicatrization with stenosis of the esophagus, resulting in dysphagia. Almost paradoxically this obstruction is often accompanied by an intensification and greater refractoriness of the sense of burning. Other complications include hemorrhage, generally low grade but tending to be persistent, or the development of a discreet area of ulceration, the "peptic ulcer" of the esophagus.

The diagnosis may well be made by the characteristic symptom-complex, notably retrosternal burning immediately upon eating or following the maneuvers mentioned above, especially when regurgitation into the mouth of sour, acid, liquid material coincides. In the far advanced case the diagnosis may be confirmed by the roentgen demonstration of mucosal alterations in the lower third of the esophagus. The presence of demonstrable gastric reflux during x-rays can be considered confirmatory but its absence cannot invalidate the diagnosis. Utilization of more critical methods for evaluating gastric reflux, such as intraluminal electrodes for pH determinations, will be more rewarding than the grossly unsatisfactory roentgen technics. Earlier in the course of the disease diagnostic alterations are grossly visible through the esophagoscope, consisting of areas of erythema with granularity, friability, and linear erosions, which may be actively bleeding. Microscopic alterations, most pronounced within the submucosa, are said to predate the gross changes[15]. The pathology is focal, largely confined to the distal third of the esophagus, and more marked nearer to the stomach. Confirmation of the diagnosis may be obtained even prior to the development of morphologic changes by the reproduction of symptoms by perfusion of the esophagus with N/10 hydrochloric acid[12].

Although peptic esophagitis has been described frequently in association with other intraabdominal pathology, notably duodenal ulcer, a definite relationship has not been established. The frequency with which peptic esophagitis and hiatus hernia coincide[16] suggests an etiologic relation and fluorocinetographic studies[17] have supported this concept. A hiatus hernia, however, at least as diagnosed by conventional maneuvers during the upper gastrointestinal examination, is not necessary for the development of peptic esophagitis and many patients with hernias demonstrable over many years escape this dread complication.

It is generally conceded that either acid or pepsin, or most likely a combination of both, are essential for the pathogenesis of peptic esophagitis. Certainly the morphologic alterations can be reproduced in dogs by esophageal perfusion with unaltered canine gastric juice, providing the pH was less than 3[18]. Similar changes occur in the cat esophagus bathed for two hours with human gastric juice, especially when obtained from patients with duodenal ulcer[19]. The reports of peptic-like esophagitis in patients with apparent achlorhydria, as well as in patients after total gastrectomy[20], are of interest.

Peptic esophagitis, especially late in the course, has been notably refractory to medical therapy, despite vigorous neutralization of gastric acidity and variegated maneuvers to lessen reflux. Neutralization is attempted by means of antacids, generally administered after meals and at other times when burning is to be expected. At best, amelioration or temporary relief is obtained; later there is often little or no effect. The addition of anticholinergics, in an attempt to decrease acid production, may produce only an intensification of the distress. This clinical observation agrees well with pharmacologic data which indicate that esophageal peristalsis is weakened[21] and gastric reflux is abetted[6] by the atropine-like drugs. The attack on gastric reflux has been hindered by the absence of an effective drug and a successful operation. Avoidance of bending, stooping, and straining, interdiction of tight corsets and belts; and elevation of the head of the bed are the best we can offer.

TABLE I

COMPARISON OF EFFECTS OF ANTACID WITH AND WITHOUT TOPICAL ANESTHETIC

	No. of tests	No relief	Ameli-oration	Complete relief
"A"	5	0	4	1
"B"	7	2	3	2

"A"—Amphojel with Oxaine
"B"—Amphojel blank

In a group of patients who had failed to respond to such measures we recently reported that the addition of an effective topical anesthetic (oxethazaine hydrochloride) to an antacid (Amphojel®) produced satisfactory relief when administered prior to meals[22]. These studies are currently being expanded by the "double-blind" method. Patients with a characteristic history, in whom confirmation of the diagnosis has been obtained either by roentgen or endoscopic means, were given the drug under study 30 minutes before meals and after meals as needed. Many had previous, unsatisfying response to other medications given postprandially. In several instances we were able to compare both forms in the same patient in successive tests, usually separated by a period of intensification of symptoms without treatment. Preliminary review of the incomplete data evidences both the advantage of the precibal administration as well as a greater effectiveness of the antacid plus anesthetic. Five of the seven patients treated with Amphojel responded, but the two failures obtained significant amelioration when the anesthetic form was used. On the other hand, no patient failed to obtain significant amelioration with combined therapy. These studies are continuing and will be reported in detail later.

SUMMARY

The direction of flow within the esophagus is normally only forward and reflux from the stomach is prevented by some mechanism so far not clearly understood. It may be an intrinsic or extrinsic sphincter, a pinch-cock action of the diaphragm, or a "physiologic" sphincter of the distal esophagus. Whatever the mechanism, its failure often results in peptic esophagitis, characterized by retrosternal burning, notably after feedings or upon maneuvers which increase intraabdominal pressure. In most patients acid-peptic factors are active in the pathogenesis of this disorder. Medical therapy has been unsatisfactory, especially in the advanced cases, and the utilization before meals of an effective topical anesthetic in an antacid appears to be warranted.

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A COMBINED MEDICAL AND SURGICAL APPROACH TO THE TREATMENT OF REFLUX ESOPHAGITIS*

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and

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Inflammation of the lower esophagus due to incompetency at the cardioesophageal junction has evolved as an important clinical entity. That this is due to digestion of the susceptible mucosa by gastric juices has been confirmed by numerous investigators[19,22] since first described by Quincke in 1879[24].

The mechanism which allows this to occur has not been entirely substantiated. It would appear that several factors interplay to prevent reflux of gastric contents into the lower esophagus. Experimental and clinical observations suggest that in man competency of the cardioesophageal openings permitting influx without reflux is dependent upon: 1. the oblique implantation of the esophagus into the lesser curvature, 2. a rugal fold, 3. a sling-like loop of gastric muscle passing around the cardia and down each side of the lesser curvature, 4. stabilization of the right border of the esophagus by the right crus of the diaphragm, 5. the phrenoesophageal ligament. It would appear that the most important of these is the oblique implantation of the esophagus into the lesser curvature. Alteration of this angle such as occurs when the stomach is displaced into the chest as a result of a sliding hiatal hernia or iatrogenic destruction following an esophagogastrectomy, permits regurgitation of gastric juices with resultant esophagitis.

The purpose of this paper is threefold: to justify medical treatment in mild degrees of mucosal inflammation with or without evidence of a hiatal hernia; to stress the repair of the hiatal hernia with replacement of the stomach and the cardioesophageal junction below the diaphragm when symptoms progress commensurate with inflammatory changes in the mucosa of the lower esophagus as observed by esophagoscopy, and finally in the severe forms of esophagitis with obstruction, ulceration and bleeding, to show that resection of the diseased esophagus and interpolation of a segment of transverse colon between the esophagus and the stomach is feasible.

Diagnosis and Pathology

Roentgen examination is usually not directly useful in establishing a diagnosis of esophagitis but it does help to indicate the additional problems such

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as the presence of a hernia, shortening of the terminal esophagus, true ulcer formation of the mucus membrane, reflux of barium into the esophagus from the stomach and narrowness or stricture of the terminal esophagus.

The diagnosis of esophagitis has to be made by esophagoscopy. Visualization will disclose that the inflammatory or necrotic change in the distal one-third of the esophagus is always present down to the first indication of gastric mucosa whether this be in the phrenic ampulla area, the so-called stomach tube vestibule, or at the juncture of the esophagus and stomach. The entire gamut of usual irritative and inflammatory changes can be seen from the simple changes of mucosal edema and hyperemia with spasm to the obliterative changes wherein fibrosis and stricture cause narrowing of the lumen. Bleeding and granular areas with exudative erosions and true ulcers can be observed. Redundant mucosal folds, within the esophagus, are sometimes seen, which are probably secondary to changes brought on by submucosal inflammation and edema. Frequently segregated gastric rugal plaits are observed in the distal esophagus. Through the esophagoscope, it is difficult to distinguish between large redundant longitudinal folds, the segregated rugal plaits, ectopic gastric mucosa and the so-called columnar epithelium of Barrett[4].

Treatment

To establish a common denominator insofar as our method of treatment is concerned, the patients have been divided into three separate groups.

Group A. Esophagitis with superficial erosion of the mucosa:—Strict medical management is essential in these instances. This includes a great variety of hopeful medical suggestions and advice which are directed toward preventing reflux and decreasing gastric secretory activity. Elevation of the head of the patient's bed is necessary to prevent nocturnal gastric reflux. This simple but effective measure utilizes the force of gravity in keeping the gastric contents out of the esophagus. The patient is advised to maintain a posture that is always upright. It is suggested he avoid bending, lifting and heavy pressure on the abdomen as is common in tight garments. A bland type of diet is recommended and for overweight patients with a hiatal hernia a reduction diet is imperative. Antacids tend to combat acid activity and act as an emollient to the distal esophagus and anticholinergics will sometimes decrease the amount of acid and pepsin production. Anesthetic agents such as procaine or xylocaine in syrup, pill, or jelly mixtures are sometimes useful. The coating agents carmethose and bismuth subcarbonate paste are useful. When severe spasm is present, sublingual nitroglycerine before eating may be used.

Belladonna and atropine have not appeared to be of any real help in the management of these patients. Recently it has been suggested that such use of atropine is actually contraindicated when reflux is present. Medihaler-nitro by inhalation for relief of spasm and to aid dilatation has been used effectively[8].

Tobacco, spices, and any medication which might be irritating must be disapproved.

On such a program most of these patients improve. When, however, the disturbance becomes severe, so as to result in intractable pain, medical therapy must be abandoned and some form of surgical manipulation be considered.

Group B. Esophagitis with ulceration of the mucosa:—Where the lower esophageal mucosa is edematous, friable, and ulcerating, only temporary amelioration of the patient's symptoms can be accomplished with adherence to a strict medical regimen. Surgical therapy must be relied upon to relieve the patient's symptoms and abate the pathological changes in the lower esophagus. The hiatal hernia, which is ordinarily responsible for the esophagitis, should be repaired if the patient is physically able to withstand the operation. If pyloric obstruction due to a peptic ulcer is responsible for the reflux, then a gastrectomy with or without a vagotomy should be performed. In our present series of patients this entity has not been observed. All who were operated upon had a demonstrable hiatal hernia which was repaired. In the event that the patient's general condition does not permit surgical intervention, then the treatment must be directed toward control of symptoms and relief of the dysphagia. Frequently esophageal dilatations and bouginage can be performed dependent upon the patient's ability to swallow without difficulty, suffice it to say that strict adherence to the foregoing medical regimen is mandatory.

Group C. Esophagitis with cicatricial obliterations of the lumen:—The end result of persistent reflux esophagitis is destruction of the mucosa; fibrosis and scar formation with stenosis of the lower end of the esophagus. Since dysphagia and regurgitation are the presenting symptoms in these individuals, therapy is directed toward eliminating the existing esophageal obstruction. Fortunately this condition is not common but when present creates a special problem. In this present series of patients, we have arbitrarily elected to either dilate the stricture or resect the lower esophagus and interpolate an isolated segment of transverse colon between the esophagus and the stomach when the condition of the patient permitted surgical intervention. In this manner the diseased process could be completely removed, the stomach remains in its normal position below the diaphragm, and a segment of viable bowel which is relatively resistant to acid peptic digestion could serve as a lower esophagus. Recurrent esophagitis was prevented and a normal swallowing mechanism allowed.

Operative Procedures

1. Hiatal herniorrhaphy:—All patients were operated upon through the left thorax in the manner described by Allison[2]. In five patients because of shortening of the esophagus and attenuation of the crura, the diaphragm was divided outward from the hiatus and a new opening created anteriorly in the left leaf of the diaphragm as suggested by Effler[12].

The left chest is opened through a long posterolateral thoracotomy incision in the 8th interspace. Following division of the inferior pulmonary ligament and mediastinal pleura over the esophagus, the latter is mobilized along with the upper end of the herniated stomach down to the diaphragm. A counter incision is made in the diaphragm 3 to 4 inches from the hiatus and the index and middle fingers of the left hand passed through this opening and down through the hiatus. The phrenoesophageal ligaments are identified and incised at the hiatus and the stomach completely mobilized in this area. A rubber tissue drain is passed around the cardioesophageal junction. This is passed through the hiatus and out the counter incision in the diaphragm. Thus by traction upon the drain, the gastroesophageal junction can be displaced into the abdomen. The crura of the diaphragm are sutured with mattress sutures of No. 1 black silk behind the esophagus. Anteriorly and laterally the phrenoesophageal ligaments are sutured to the undersurface of the diaphragm through the counter incision in the diaphragm and out of the thoracic surface of the diaphragm where they are tied. This is an additional maneuver to retain the cardioesophageal junction below the diaphragm and maintain the angle of the inosculation of the esophagus into the stomach.

In those patients in whom it was impossible to place the cardioesophageal junction beneath the diaphragm due to a short esophagus, a new hiatus is created by dividing the right crus and incising the diaphragm anterolaterally. In this manner the stomach can be placed below the diaphragm and a satisfactory repair of the diaphragm posterior to the cardia accomplished.

2. *Resection of the lower esophagus and interposition with a segment of colon:*—Although the technic for colon replacement of the esophagus has been described in detail elsewhere[20], resection of the lower esophagus for stenosis due to reflux esophagitis demands special consideration. The entire procedure can be accomplished through a left thoracic incision. The upper abdomen is entered by incising the diaphragm from the hiatus to the costal margin. The lower esophagus is mobilized from the inferior pulmonary vein to and including the cardia and fundus of the stomach. By successive division of the short gastric vessels and the gastrocolic omentum, a sufficient segment of the distal transverse colon and splenic flexure can be mobilized to serve as an esophageal substitute. Before transection of the colon proximally and distally, one must be assured that the blood supply is adequate, and the mesentery is of sufficient length to allow the viable segment to be transposed between the upper esophagus and stomach. An isoperistaltic anastomosis should be performed between the esophagus and the colonic segment.

The diseased lower esophagus is resected and the opening in the stomach closed with two layers of inverting catgut reinforced with silk. The colon is transected proximally and distally and the mesentery divided down to the nutrient vessels. The colon is reunited in the usual manner and the defect in the

mesentery closed. The isolated colonic segment with an intact blood supply is then interpolated between the esophagus and a new opening in the stomach. The diaphragm is re-approximated about the colon segment in such a manner that the stomach cannot herniate into the chest. A No. 20 Foley catheter is inserted into the stomach for postoperative gastric decompression and feeding. The end of this tube is brought out through a stab wound in the left upper quadrant before the diaphragm is completely closed.

The patient is allowed nothing by mouth for the first six days. Thereafter his diet is increased orally and supplemented through the gastrostomy tube if necessary. This tube is removed when the patient is eating normally.

Results

In the past ten years we have had the opportunity to help manage 97 patients with a variety of types of esophagitis. All of these patients were placed initially upon medical management. Those who had conical narrowing of the distal esophagus were subjected to bouginage, and a few were tried with the Olive dilator. For the most part when a bougie could not be properly placed and the Olive dilators were tried, such patients ultimately became candidates for surgical intervention.

Fifty-eight patients were felt to have significant reflux esophagitis. Twenty-three were subjected to dilatation or bouginage. All patients who were treated medically, and by dilatation, had some slight or temporary relief but, ultimately, 58 had insufficient relief of symptoms to warrant further conservative care.

Eighteen originally had a firmness of the distal aspect of the esophagus which was sturdy enough to consider adequate for a diagnosis of stenosis, or at least fibrous change with a fixed narrowness of the distal esophagus. Only one of the entire group of 58 had significant bleeding in his history, but 23 had had episodes in their past history of iron deficiency anemia or the finding of frequent guaiac positive stools, through their course of illness.

Of the group of 58 considered significantly ill, 37 had evaluation of the presence of acid in the stomach, and only one had no hydrochloric acid demonstrable after histamine stimulation. Fifty per cent of the patients were significantly ill and, approximately 50 per cent of the people with esophagitis had lost weight.

Nine of the 58 patients had a history of a diagnosis of duodenal ulcer in the past. Fifty-three of the 58 had a hiatal hernia which was diagnosed clinically after roentgenographic and esophagoscopic study. In the 5 remaining individuals with reflux esophagitis, no demonstrable hiatal hernia could be demonstrated. In all five patients longitudinal folds and segregated gastric rugal plaits were seen through the esophagoscope. Biopsies of the areas involved demonstrated columnar epithelium or true gastric mucosa, but after consultation with

the roentgenologists and pathologists involved in the various cases, we were unable to completely reach an accord as to whether these were truly rugal plaits in the esophagus, Barrett's tissue or gastric tissue obtained from the mucosal juncture in what Palmer contends is an ever-present stomach tube vestibule.

Forty-eight patients have had transthoracic repair of the hiatal hernia during the course of their care. In two patients recurrence of the hernia is evident both radiographically and clinically with significant esophagitis.

In eight patients with severe disabling obliterative, stenosing esophagitis the distal esophagus was resected and replaced with a segment of transverse colon. To date all of these patients have been able to eat in a normal manner, have gained weight, have normal nutrition, and show no evidence of esophagitis, colitis or gastritis. In three patients, in whom the interposed colon had to be inserted antiperistaltically, occasional regurgitation is present.

TABLE I

CLINICAL RESULTS IN ESOPHAGITIS
97 PATIENTS (58 WITH REFLUX)

Treatment	No. of cases	Results
Medical		
Antacids, etc.	97 (initially)	?
Bouginage	23	7 asymptomatic with repeated dilatations
Surgical		
Hiatal hernia repair	48	No deaths 2 recurrences
Colon transplants	8	No deaths, no colitis, gastritis or esophagitis

COMMENT

What is presently referred to as acid peptic esophagitis was first described in 1879 by Quincke[24]. In 1906, Tileston[29] felt that insufficiency of the cardia allowing regurgitation of gastric juice was essential for the development of the esophageal ulcer. He reported three cases and stated that scarring of these large ulcers resulted in esophageal stenosis.

In 1935 Winkelstein[31] established peptic esophagitis as a new clinical entity. He held that the association of peptic ulcer and the hyperchlorhydria together with the esophageal ulceration suggested that this was peptic in origin.

Allison[2] demonstrated in a large series of patients that a hiatal hernia which allowed regurgitation of gastric contents into the lower esophagus was responsible for the esophagitis.

Olson[22], Benedict[6], Sweet[28], Barrett[5], and Aylwin[3] have also incriminated the gastric juices in causing inflammation of the lower esophagus with the anatomical abnormality allowing this to occur being a diaphragmmatic hernia.

Experimental evidence tends to substantiate the foregoing clinical observations. In 1938, Selye[26] produced hemorrhagic esophagitis in rats by ligating the pylorus, indicating that the prolonged bathing of the normal esophagus by gastric juices would produce inflammation. Ferguson[13] found that acid gastric juice in contact with the esophagus for a prolonged period of time had a devastating effect upon the mucosa whereas hydrochloric acid in similar concentrations had little influence by itself.

Although the method of treatment in reflux esophagitis, wherein the inflammatory process can be ameliorated by repair of the hiatal hernia is apparent[9,10], the procedure of choice in benign stenosis has not been clarified.

Bouginage either directly or over a previously swallowed string is easy to perform and allows temporary relief from dysphagia, but it is traumatic and extremely uncomfortable to the patient. This mode of treatment, however, is extremely advantageous when ancillary pathology precludes operative intervention.

That the solution to the problem of severe cicatrizing esophagitis is not simple can be attested to by the numerous operative procedures which have been advocated for its cure. Since prompt recurrence of the disease process followed partial esophagogastrectomy, Sweet[23] advocated extensive esophagectomy and high esophagogastrostomy. McLean and Wangensteen[17], Ellis[13], Burford and Lischer[7] have preferred various forms of gastric resections and gastric drainage procedures with or without vagotomy. Effler[12] has advocated advancing the shortened esophagus from the hiatus to the dome of the diaphragm. Collis[9] and Adler[1] have reconstituted the cardioesophageal angle. In addition to reconstituting the angle, Watkins[30] wrapped the anterior and posterior surfaces of the stomach around the distal esophagus thereby creating a tunnel for the prevention of reflux. Redo and Barnes[25] utilized a submucosal tunnel in the stomach for the distal esophagus in an attempt to prevent regurgitant esophagus.

Resection of the diseased esophagus and interposing a segment of jejunum or colon between the esophagus and stomach was evaluated experimentally by Sirak, Clatworthy and Elliot[27] in 1954. Merendino and Dillard[18] in 1955, reported their clinical observations using jejunum and a transplant and in 1957, Neville and Clowes[21] successfully utilized a segment of colon to replace the lower esophagus following resection for severe ulcerating stenosing esophagitis. Recently Grimes and Stephens[15] have used a segment of ileum and colon to replace the lower esophagus.

Dissatisfaction with esophagogastrectomy following resection of the esophagus for carcinoma led us to evaluate the use of the colon as an esophageal substitute[20]. Although at the outset it was our intention to use this segment of bowel to reconstruct the esophagus primarily in patients with carcinoma, the postmortem absence of esophagitis, colitis and gastritis in patients dying of carcinoma led us to extend this operative procedure to patients with obliterative esophagitis[21]. It would appear from our immediate results that the colon can serve as a satisfactory substitute for the lower esophagus.

Postoperative roentgenograms and esophagoscopy have repeatedly confirmed the absence of esophagitis in those patients wherein a colon segment has been used to replace the stenosed esophagus following resection for benign obliterative disease. As, however, mentioned by Haight[16], that although the esophagus is protected, there is still free regurgitation of stomach contents into the colon segment. Over a period of time ulceration may become evident in this area. From our own observations in patients with colon transplants up to six years following implantation and accumulated experimental data, it would appear that the colonic mucosa is relatively resistant to acid peptic digestion. Thus, it would seem that the use of a segment of colon to replace the lower esophagus in patients with severe benign stenosis is feasible and is a reasonable approach to this problem.

Summary

1. The diagnosis and treatment of 97 patients with a variety of types of esophagitis are presented. Fifty-eight were adjudged to have significant reflux esophagitis.

2. Initially all patients were placed on medical management, surgical therapy was undertaken when progression of the disease was evident. Repair of the existing hiatal hernia was performed when this was adjudged to be the causative factor in allowing the esophagitis to occur.

3. In severe stenotic esophagitis, a segment of transverse colon was used to replace the lower resected esophagus. The efficacy of this procedure is discussed.

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Discussion

Dr. Asher Winkelstein (New York, N. Y.):—I would like to thank the speaker for his kind reference to my original description of peptic esophagitis before the American Medical Association in 1934.

Since the publication of my paper many papers have appeared on the subject of peptic or so-called reflux esophagitis. The one that was presented

this morning by Dr. Neville and Dr. Bartunek is a very interesting and important approach to the surgery of the complications of this condition.

In general we are in agreement with Drs. Neville and Bartunek. At The Mt. Sinai Hospital in New York, however, we are more optimistic than the essayists about the medical therapy of peptic esophagitis.

First I'd like to make the comment that we feel that there are several groups of peptic esophagitis. Certainly not all of the cases result from hiatus hernias.

We also feel that the statement that 80 per cent of esophagitis cases associated with hiatus hernias are refractory to medical therapy is too high a figure.

We have frequently avoided hernia operations, which unfortunately, despite the good results you've seen this morning even in the best of hands are followed fairly frequently with recurrences, by the use of good medical therapy.

Now what do we consider good medical therapy? We use an ulcer diet; in some rare cases, the drip therapy; erect position during the day and elevation of the head and shoulders at night; alumina gels before and after meals; and most important of all, mechanical dilatations.

We do agree that massive hemorrhage is a definite indication for repair of the hernia. We also would like to point out that some of the strictures that are described, especially roentgenologically, are not unyielding fibrous strictures. With dilatation through the esophagoscope first with the Jackson bougie and later with the Hurst mercury-weighted rubber bougie we have frequently been able to avoid these massive operations for stricture of the esophagus complicating peptic esophagitis.

We definitely agree with Drs. Neville and Bartunek that for unyielding fibrous strictures esophagogastrectomy is necessary.

(Slide) This is the way we are in the habit of classifying peptic esophagitis. The ones with gastroduodenal ulcer do not have a hernia as a rule. Then we have the marginal ulceration with hiatus hernias and certainly after prolonged intubation and lavages and after severe vomiting, particularly in pregnancy and alcoholism. We also see severe peptic esophagitis after anastomosis of the esophagus with the stomach, particularly for achalasia. We also have the solitary peptic ulcer.

(Slide) Now here is a patient, the slide on the left shows what seems to be an advanced stenosis of a peptic esophagitis occupying the whole lower half of the esophagus associated with the duodenal ulcer.

This patient on repeated dilatations shows a widening to almost a normal caliber and a very good clinical result without the use of surgery.

(Slide) This is characteristic—on the left is the large patch of marginal ulceration associated with a hiatus hernia. After the medical therapy which I described before, the ulcer crater has completely disappeared and the diameter of the esophagus is quite normal.

(Slide) The final slide shows a small hiatus hernia and a narrow area of the esophagus in which there is an ulcer crater. This is the so-called Barrett ulcer or the solitary ulcer which occurs in a patch of persistent embryonal tissue or ectopic gastric mucosa.

Even this type of ulcer, which frequently penetrates and bleeds, completely healed with adequate medical therapy.

I would like to conclude by complimenting Drs. Neville and Bartunek on their large experience with these difficult operations in the serious complications of peptic esophagitis.

THE SURGICAL MANAGEMENT OF HIATAL HERNIA*†

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As a result of better understanding of the anatomical derangement of the esophageal hiatus in hiatal hernia, engendered by the work of Allison, interest in the surgical treatment of this defect has been intensified. Accumulating reports indicate that this surgery can be performed with low operative mortality[1], is mechanically effective, and carries a low incidence of recurrence[2]. While some controversy still exists as to the best approach, the basic features of the several operative procedures being employed are essentially similar. The major difficulty today lies in the selection of the patient for surgery.

Hiatal hernia is an exceedingly common lesion. In 100 unselected patients subjected to barium contrast roentgen studies for varied lesions of the alimentary tract, the radiologists at the Graduate Hospital were able to demonstrate a hiatal hernia in exactly 50[3]. The majority of patients with hiatal hernia do not have symptoms referrable to it, and available evidence does not indicate that a high percentage of these will progress to symptomatic or complicated states. In this regard the condition is similar to that which prevails in colonic diverticulosis. Furthermore, there appears to be no correlation between the size of the hernia and the appearance or existence of symptoms. Unless studies on the course of patients with asymptomatic hernia reveal that these will often progress to a symptomatic or complicated state, it would seem that surgical correction of the hernia in the asymptomatic case is unjustified.

At the other end of the scale are those patients who have complicated hiatal hernias and in whom surgical intervention is a necessity. This is a small group which in our experience represents about one-fourth of the cases operated on. It is comprised of those presenting with: 1. gross bleeding which may occur as an acute, massive blood loss, but more often it is characterized by continued slow oozing resulting in anemia and blood in the stool; 2. peptic ulceration either in the terminal esophagus above the hernia or in the herniated gastric pouch; 3. esophageal stenosis or stricture secondary to long-standing reflux esophagitis with or without actual ulceration; and 4. mechanical obstruction due to torsion or volvulus of the incarcerated stomach in large parahiatal hernias. The need for operation in this group is well recognized, and at times the surgery may be emergency in nature. Our experience in this area indicates that surgical correction of the hernia is highly satisfactory in eliminating the

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complication with the possible exception of those patients who have irreversible esophageal strictures. In two patients with this complication, hiatal hernia repair plus esophageal dilatation have failed in lasting relief of dysphagia, and subsequently esophageal resection with jejunal interposition was required.

About three-fourths of the cases operated on for hiatal hernia are selected for surgery because of the presence of symptoms for which they are unable to obtain relief by medical measures, or they have symptoms or signs indicative of esophagitis.

The symptoms of this lesion are most likely due to the presence of acid gastric juice retained in the thoracic gastric pouch or refluxed into the terminal esophagus. They are characterized by such general terms as heart burn and substernal spasm or cramp-like distress occurring particularly after meals or when reclining. Relief maybe obtained by standing, or the patient may be more comfortable when the stomach is empty. Epigastric fullness, excessive belching, bloating, indigestion, and the regurgitation of sour material into the pharynx are terms often used by patients in explaining their distress. Dysphagia brought on by esophageal spasm is occasionally noted. This is apt to vary in severity which will increase during periods of anxiety or tension and may disappear when the patient is relaxed. While the relation of pain to food intake is not that which is characteristic of duodenal ulcer disease one should remember that the two lesions can coexist. Furthermore some of these complaints are associated with biliary tract disease or cardiovascular problems, and one can appreciate the importance of a diligent search for associated lesions before attributing all of the patients' distress to hiatal hernia. When we are convinced that the hernia is the cause of symptoms, the patient is so informed. The decision to operate is then considered in the light of the severity of the symptoms and the response to a medical program. At times this decision has been facilitated by reproducing the patients' symptoms with the barium meal during the x-ray examination. There is little doubt that in this group of patients, the careful exclusion of those with purely functional problems such as aerophagia improves the percentage of good operative results.

Objective evidence of esophagitis in the patient with symptomatic hiatal hernia is regarded as a strong indication for surgical treatment. The evidence of esophagitis may be based on endoscopic or roentgen findings. It is our belief that esophagitis is due to reflux of acid gastric contents into the esophagus, and we have noted that reflux can be demonstrated frequently in patients with sliding hiatal hernia and infrequently in those without it. How frequently this inflammatory change in the esophagus ultimately progresses to frank ulceration, hemorrhages, and/or stricture is unknown, but when it does, the case becomes most difficult from the medical or surgical standpoint. In a small series of patients with hiatal hernia, Blades noted the occurrence of such complications in half the cases followed. Except for a single recent case, a good hernia repair

has, in our experience, arrested this regurgitation. Therefore we feel that early surgical repair is indicated in the case where esophagitis is suspected.

Adult hiatal hernia is an acquired lesion arising as a result of anatomic changes that progress with age. In this regard it is somewhat similar to direct inguinal hernia. As is the case with any abdominal herniation, it is important for the surgeon to understand the structural defect that exists, so that it can be corrected in a manner which will also restore proper function. Allison has clearly defined the defect and has correlated it with altered function of the cardioesophageal junction[4]. Most of the approaches to surgical repair embody the principles which he described. A sound repair should consist of reduction of the herniated stomach, excision of the sac or obliteration of the sac, narrowing of the hiatus to a diameter that will just accommodate the esophagus, and shortening and re-attachment of the phrenoesophageal ligament. If these essential features are included in the repair, the approach is of secondary importance.

Our preference is for repair by way of a transthoracic approach. At present we follow a modification of technic described by Humphreys in which no counterincision is made in the diaphragm[5]. In an effort to minimize postoperative incisional distress, an intercostal incision is used and extensive retraction is avoided. The chest is not drained. The patient is fed a bland diet on the first postoperative day. Care must be taken to avoid the substitution of one annoying symptom such as prolonged thoracic incision pain for the symptoms of hiatal hernia. In our experience the transthoracic approach gives superior exposure in the obese patient, the patient with a very large hernia, and the case with evident shortening of the esophagus, and thereby facilitates the technical steps of the operation.

As long as the surgeon is thoroughly familiar with the essentials of a sound repair, I am sure that good results can be obtained by way of an abdominal approach. In fact the decision of a transthoracic versus an abdominal approach should not be made on the basis of the surgeon's preference but should be based upon what is best for the individual patient. For example we elect to repair hiatal hernia by way of the abdominal approach when there is concomitant intraabdomial disease which we wish to correct or when there is uncertainty regarding the role played by the hiatal hernia in the production of symptoms such as bleeding. A number of authors have suggested that the recurrence rate is higher following transabdominal repair, but it should be noted that many of these were using methods of repair which have since been discarded.

We have carried out hiatal hernia repair in 92 patients. There was one operative death in the group due to a myocardial infarction on the second postoperative day. Three recurrences have been demonstrated by postoperative roentgen examination but to date these patients are symptom-free. Additional recurrences may come to light when more of the group are studied and a longer

postoperative follow-up is possible. Thirty patients were operated on in the past two years. In two patients with esophageal stricture additional surgery was required for relief of dysphagia. One man has reduction of his hernia but still has esophageal reflux. Three patients with rather marked anxiety have been intermittently troubled with discomfort along the course of the thoracic incision and have required analgesic drugs for relief. The remaining 90 per cent have had control of their symptoms or complication and regard the operation as a success.

Summary

Operations for correction of hiatal hernia are now based upon an improved understanding of the anatomy and physiology of this area. The procedures are effective in a high percentage of cases with minimal risk. Surgical correction is recommended for all complicated hiatal hernias plus those with symptoms not readily arrested by medical measures. The essential features of a sound repair can be performed through a transthoracic or a transabdominal approach.

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Discussion

Dr. Stephen H. Deschamps (Bridgeport, Conn.):—As the last speaker of the morning session I'm sure that I share with you a combination both of hypoglycemia and hyperchlorhydria—

(Laughter.)

—and I will try to be very brief in my remarks.

The foregoing papers: Dr. Frobese's, as well as those preceding him, have demonstrated the continued renaissance in the researches that have been carried out regarding the role of hiatus hernia in peptic esophagitis. This was amply demonstrated at the Annual Session of this College in New Orleans and it is refreshing to see that it has continued.

The frequent association of hiatus hernia with other gastrointestinal conditions has been stressed by the preceding authors, and it is one point perhaps in favor, Dr. Frobese, of the transabdominal approach.

As was very correctly stated, the technic is something to be left to the surgeon, and the route used is perhaps less important than the dexterity applied, and the recognition which is given to the presence of other conditions, either within the abdomen on the one hand, or within the chest on the other. The thoracic surgeon, or any surgeon who insists upon an Allison approach via transthoracic incision, in the presence of pulmonary conditions, would be equally liable to criticism.

I have two slides which are both for purposes of illustrating just one or two points.

In the first, I wish simply to show, in this very small series of 20 patients which were rather hastily gathered, the frequent occurrence of gastrointestinal conditions; in particular, those of gastroduodenal ulcer, which occurred in six of these 20 patients; gallbladder disease; and finally diverticulosis. The so-called "Saint's Triad", consisting of diverticulosis and cholelithiasis in the presence of hiatus hernia, was not encountered in our series.

It has been stressed, quite recently in a paper by Dr. Tumen to which Dr. Finkelstein in fact also contributed, that it is not the *size* of the hiatus hernia which is important, but the fact that *its presence facilitates the occurrence of reflux of gastric contents,* and the production of a reflux-type peptic esophagitis which is most important here.

Because of the above very crucial fact, and no one this morning has stressed this, in the study of all patients with gastroduodenal ulcer, with gallbladder disease, or with other gastrointestinal conditions, a particular and repeated search may perhaps be necessary to determine the presence of hiatus hernia and consequent acid-reflux. Esophagoscopy may be indispensable in determining reflux, and is not to be foregone. Whether or not hiatus hernia or suspicion of peptic esophagitis is found, it is exceedingly important.

In the second slide that I wish to show, insofar as treatment is concerned, and speaking as a "medical gastroenterologist", of course, we have *surgical repair* in fuzzy type on the very bottom. As Dr. Winkelstein correctly said, the principles of treatment for hiatus hernia are similar to those for reflux esophagitis, and consist of the avoidance of this very thing: the reflux of acid. This is exceedingly important, and can be performed by the foregoing measures, as already discussed.

Surgical repair, however, is not to be considered as a "final resort", and Dr. Frobese made this properly clear. Blades and Hall, also felt that surgical repair should be considered much earlier rather than when forced by massive bleeding, or the development of the stricture which cannot be bouginaged. In a series of 66 patients in their surgical series, there were 32 instances of serious complications, 22 of these were bleeding and the others with stricture. It is also important, as these authors stress, in doing the surgery, to carry out a

so-called "physiological repair", by restoration of the pinch-cock mechanism. *This can be done regardless of whether the approach is transthoracic or transabdominal.*

The opportunity, as I stated before, to explore the abdomen, and to investigate the presence of other lesions (particularly those of the pancreas, as well as those known to exist by radiographic studies), are perhaps in favor of the transabdominal approach.

It has been stressed by McBurney, that there is a sharp increase of both the recurrence rate as well as the mortality when surgical repair is delayed until such complications as bleeding or stricture have taken place. It is, we think, quite significant in that in the 69 cases which McBurney reported, there were *30 instances of simultaneous corrections of other conditions,* of which approximately half were cholecystectomy.

I'd like to thank Dr. Frobese again for his very interesting paper and to all of you for waiting.

POSTGASTRECTOMY SYNDROMES*

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It is not surprising that certain digestive sensations and some distressful symptoms often follow partial or total gastrectomy. In fact it is most amazing that the human body can make adjustments for such a radical surgical procedure which reduces the reservoir function of the stomach, largely eliminates peptic digestion, modifies the application of hepatic and pancreatic ferments to the ingested food, interrupts some of the nervous impulses to the upper digestive tract and does away with the normal controls over the emptying of the stomach and the rate of filling of the small intestine.

The symptoms that are inherent in this formidable modification of gastric physiology, mild in some instances and disabling in others, are the price the patient pays for being free of peptic ulcer. When important symptoms develop, the price seems high and the patient is said to have a postgastrectomy syndrome.

One of the most important changes in the physiology of the digestive tract resulting from the removal of the antrum and pylorus is the loss of the normal mechanism which regulates the emptying of the stomach. Instead of the slow, regularly repeated injections into the duodenum of a few cubic centimeters of food which has been softened, liquefied, acidified, partially digested, and brought to body temperature by the stomach, food is directly and immediately introduced into the jejunum in the state in which it is swallowed. Instead of the normal empyting time of from one to four hours, the entire meal is usually in the small intestine in a matter of minutes.

When the jejunum is thus suddenly filled with undigested food, certain things begin to happen. Some patients experience in varying degrees of severity a set of symptoms which has come to be known as the dumping syndrome.

Early Postprandial Dumping Syndrome

Within 10 to 20 minutes after the ingestion of food or drink, some patients following gastrectomy have symptoms of upper abdominal distress described as a sensation of excessive fullness which may be severe enough to cause nausea and vomiting. Signs of small intestinal hypermotility, including borborygmi and sudden diarrhea, may also be present. Associated with these digestive symptoms there is often a set of sympathetic disturbances, chiefly vasomotor, which include weakness, palpitation, pallor, sweating, tachycardia and occasional syncope.

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Although a large majority of patients who have had gastrectomy experience dumping symptoms either frequently or infrequently and in varying degrees, fortunately the symptoms are severe or disabling in only a small percentage. There is a wide variation (from 2 to 75 per cent) in the reported incidence of this postoperative side-effect depending upon the criteria used by the observer. If temporary, infrequent and mild symptoms are included, the upper figure of 75 per cent is apparently correct; however, in a group of patients who had a ten-year follow-up after subtotal gastrectomy I found that dumping symptoms persisted in 8 per cent of cases but were severe enough to be important in only 4 per cent[1].

It is generally accepted that the initiating factor in the production of the dumping syndrome is the rapid filling of the jejunum with undigested food or drink, but there is a lack of unanimity of opinion regarding the mechanism which triggers the sympathetic outflow that produces the vasomotor features.

Investigators have found that a number of physiologic reactions take place when food is taken by the patient in the postgastrectomy state. An abnormal mechanical distention of the jejunum may occur which is thought by many to be the source of the sympathetic reflex. By mixing barium with food, Abbott and co-workers[2] found a correlation between the symptoms and the rate of filling and degree of distention of the small intestine. Machella[3] showed that distention of the jejunum with a balloon would produce the symptoms. In addition to the rapid emptying of the gastric stump, plasma water passes rapidly from the circulation into the lumen of the intestine as a result of osmotic forces, which further tends to increase jejunal distention.

It has been repeatedly observed that hyperosmotic solutions ingested by the gastrectomized patient or introduced by intubation directly into the jejunum of patients with intact stomachs produce dumping symptoms coincident with rapid flow of plasma fluid into the lumen. Normally the stomach and duodenum produce from ingested food a chyme which is isotonic with the blood.

Roberts and others[4] found that the immediate transfer of fluid from the circulating blood to the intestine amounted to a reduction of blood volume of from 200 to 800 c.c. and proposed that this sudden reduction in circulating blood volume was the factor that excited the sympathetic system. Webber and co-workers[5] found that the average drop in plasma volume was small (only 172 c.c.) and that there was no correlation between the magnitude of the volume decrease and the symptoms.

Some alterations in the digestion and absorption of carbohydrate have been observed in the postgastrectomy state. When concentrated solutions of glucose are ingested there is a rapid absorption with a rise of blood sugar to hyperglycemic levels more or less coinciding in time with the onset of symptoms. It is generally thought, however, that the osmotic effect of the glucose solution is more important than the hyperglycemia as a cause of symptoms.

Other physiologic reactions that have been noted include a slight drop in serum potassium, observed by Smith[6] to occur about one hour after meals, somewhat later than the onset of symptoms. Associated with this, temporary changes in the electrocardiogram characteristic of potassium loss have been demonstrated. The fall in potassium and phosphorus has been explained as related to the deposition of glycogen associated with the rapid absorption of glucose. It is probably a coincident phenomenon and not important as a cause of symptoms.

The exact mechanism by which the early dumping reaction is produced remains unsettled. Certain inconsistencies and uncertainties in the correlations of all of the observed factors leave some doubt that the symptom-complex has a single constant precipitating cause. Unquestionably there is an individual factor such as an abnormal homeostatic vascular response to such stimuli as distention of the intestine or decrease in blood volume that is responsible for the vasomotor symptoms which occur in certain patients and fail to develop in others[7].

Peripheral vascular constriction may serve to compensate for loss of blood volume and prevent symptoms. It has been noted that patients who have a concomitant increase in peripheral blood flow have the most severe symptoms.

Late Dumping or Hypoglycemic Syndrome

A characteristic sharp rise in blood sugar has been observed after the ingestion of carbohydrate, and in some cases the rise is followed by a drop to hypoglycemic levels, apparently due to an exaggerated response of the pancreas to the stimulation of sudden hyperglycemia. In a small number of cases the reduction in blood sugar is severe enough to produce typical symptoms of hyperinsulinism and hypoglycemia.

This comparatively rare reaction may go unrecognized since the symptoms are similar to the more common dumping symptoms except that the reaction occurs from one to two and a half hours after a meal and is relieved by food. Designated as the late dumping reaction, it may follow or overlap the immediate postprandial dumping syndrome.

Undernutrition

Although severe disability from the dumping syndrome occurs in comparatively few cases the postprandial symptoms have an important bearing on the more common side-effect of gastrectomy, the difficulty to gain or maintain body weight.

In general, the appetite remains unimpaired following partial gastrectomy but many patients either consciously or unconsciously limit the amount of food taken at a meal because they have learned that if they eat more than a certain

quantity, distress inevitably occurs. Patients may feel and honestly believe that they have eaten a normal-sized meal but actual calculations of the caloric intake have shown that the food intake of the undernourished gastrectomized patient is less than normal. Typical dumping symptoms may not necessarily occur but the loss of the elastic reservoir provided by the intact stomach almost invariably limits the amount of food a patient can take without discomfort. Recognition of the importance of this reduction in the reservoir function of the stomach with the attendant limitation of food intake constitutes the main influence in the recent swing toward more conservative resection for duodenal ulcer. Zollinger[8] has emphasized the common observation that the undernourished, birdlike eater before operation presents the most serious nutritional problem after surgery.

Malabsorption and Metabolic Syndromes

The amount of fat excreted in the stools has been observed to increase after gastrectomy, apparently on the basis that the food mixes inadequately with bile and pancreatic juice. Although this amounts to considerable caloric loss in some patients, the diminished intake of food remains the most important factor in failure to gain weight.

Some of the less prominent metabolic alterations that follow subtotal gastrectomy involve the absorption of iron and Vitamin B_{12} and the maintenance of a normal hemoglobin level.

The reports on the incidence of anemia in postgastrectomy patients vary considerably. Rumball and Hassett[9], on reviewing the literature, found the incidence to range from 0 to 44 per cent. Their considered conclusion was that if a careful evaluation is made of each gastrectomy patient, hypochromic anemia would be discovered in a significant number. That iron deficiency is a common sequel to subtotal gastrectomy was further supported by their finding of low or borderline iron content of the serum of one-third of the patients studied. There is some evidence that this is the result of malabsorption of iron due to bypassing of the duodenum where iron is chiefly taken up from the intestinal tract and to the failure of the partially resected stomach to reduce iron compounds from the ferric to the ferrous state.

Although megaloblastic anemia indistinguishable from pernicious anemia inevitably occurs after total gastrectomy, the incidence following subtotal gastrectomy has been estimated by MacLean[10] to be less than 1 per cent. Apparently a residual pouch of normal fundus consisting of no more than 10 per cent of the stomach is capable of producing sufficient intrinsic factor to prevent Vitamin B_{12} deficiency. This type of anemia usually occurs after resection for gastric ulcer or gastric carcinoma, suggesting that impaired production of intrinsic factor owing to preexisting diffuse gastric disease is further reduced by partial gastrectomy to subcritical levels, with the development of B_{12} deficiency. MacLean has found that, on microscopic examination, the resected portion of

the stomach showed atrophic changes, from which the development of anemia could be predicted. All patients with megaloblastic anemia after gastrectomy respond favorably to B_{12} therapy.

Afferent Loop Syndrome

Nausea and vomiting occur in about one-half of the patients with the dumping syndrome. The vomitus is characteristically small in amount, and contains considerable bile but no food. This has been explained as the result of the rapid emptying of the gastric remnant and the only material in position to be vomited is some bile and pancreatic juice from the afferent loop. When, as sometimes happens, the vomitus consists of 500 c.c. or more of bile-colored fluid, it is evident that some stasis has been present in the afferent loop with sudden emptying into the gastric pouch. Partial mechanical obstruction caused by acute angulation, prolapse of mucosa, adhesions, or volvulus is considered to be the cause of this side-effect known as the afferent loop syndrome. It is often difficult to diagnose and may be confused with the dumping syndrome or neurotic or functional vomiting. Jordan[11] has pointed out that afferent loop stasis may not be demonstrated by roentgenologic examination unless the patient drinks barium to the point of extreme fullness or unless the efferent loop is blocked by a balloon before the barium drink is given. The importance of the diagnosis lies in the poor response to conservative treatment and the need for surgical correction for relief.

Neurotic Symptoms Following Gastrectomy

Some clinicians have been inclined to attribute most of the postgastrectomy complaints to neurotic or functional disturbances. There is no question but that emotional factors have an important role in both the production of symptoms and the disability they cause. It is well known that the nervous, anxious patient is more likely to have dumping symptoms than the stoic individual who does not complain unless distress is severe. A lack of understanding by the patient of the changes in gastric physiology and the attendant sensations may set up an anxiety state which further aggravates the symptoms. Disappointment when a totally asymptomatic state is not achieved by operation may add an element of discouragement. Some patients are so upset that they retch, belch and swallow large amounts of air which add to their distress. Even when mechanical obstruction due to a malfunctioning stoma exists, the symptoms may be highly suggestive of a neurosis.

Treatment

Since more than one physiologic factor may be operative in producing symptoms and functional factors may also be involved, treatment of postgastrectomy syndromes requires individualization. Patients who have severe

symptoms should be hospitalized so that an individual program can be worked out. The regulation of the diet and eating habits are the most important features of treatment. In dietary planning the physician should take into account the fact that small quantities of food given at more frequent intervals provide a more adequate daily ration. Solid food is better tolerated than fluids, protein better than carbohydrates, and natural fats are to be desired over homogenized fat preparations. As a rule, milk and ice cream are poorly tolerated. Robinson and Pittman[12] used a graduated feeding program which finally evolved into a schedule of six small dry meals daily without sugar or milk. Their goal for the underweight patient was a diet of carbohydrate, 100 gm., protein, 125 to 150 gm., and fat, 200 to 250 gm., for a total of 3,000 calories. Following the recommendations of Hayes[13], the caloric requirements should be supplied in the ratio of carbohydrate 1, protein 1.5 and fats 5. He noted that patients seem to tolerate a high fat diet better after than before operation and that the low-carbohydrate, high-fat diet was effective in the treatment of both the early dumping syndrome and later hypoglycemic syndrome.

The routine directions given by the author to gastrectomized patients on discharge from the hospital are that the daily food intake be divided into five or six equal meals, solid foods emphasized, and soups, eggnogs, milk, ice cream and other liquid foods avoided. Syrups, sugar, very sweet desserts, and cooked cereals such as cream of wheat are to be used only if tolerated. Beverages are allowed but are to be deferred until 20 minutes after completion of the meal and should be taken slowly. Except for these restrictions, the diet is not limited and may include fruits, vegetables, fried foods and pastries. If no gain in weight results, the patient is urged to eat more fat. A simple way to increase the fat intake is to add one-fourth of a pound of butter daily, which can be used on bread or vegetables. A recumbent position immediately after eating minimizes symptoms in most cases; frequently, of course, the patient has no opportunity to lie down after meals.

Jordan[14] recommended the use of anticholinergic drugs to reduce motility. He stated that the action of such drugs is variable and unpredictable. I have also found the anticholinergics unreliable and in general unsatisfactory. The dumping syndrome apparently is not a vagotonic disturbance since it is not prevented by atropine or by vagectomy.

Psychotherapy has a role in the treatment and should be considered an adjunct and not the total therapy. An explanation of the cause of his symptoms, reassurance, and directions for stopping aerophagia are important.

Individual management with attention to details can do much in the treatment as well as the prevention of postgastrectomy syndromes. The problems are inherent in the present surgical treatment of ulcer but if adjustment to the postgastrectomy state is taken into account as part of the therapeutic plan, and the operation is routinely followed by careful dietary instructions and other

measures to help the patient make the adjustment, a therapeutic failure may be turned into a success.

Nonsurgical measures are adequate in nearly all cases but a few instances of intractable symptoms remain which should be suspect of organic malfunction, such as obstruction of either the afferent or efferent loops. Surgical revision may then be necessary.

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DISCUSSION

Dr. Jacob J. Weinstein (Washington, D.C.):—I indeed enjoyed Dr. Kiefer's precise discussion of this very complex problem.

I think it becomes obvious to us this morning that the treatment of peptic ulcer by gastric resection, regardless of type, produces abnormal anatomical and physiological complexes which interfere with the normal physiologic functions of the stomach, duodenum, biliary tract, and pancreas. We can, therefore, expect to see, and do see abnormal or depressing effects on the normal efficiency of digestive processes in from 30 to 75 per cent of all patients subjected to subtotal gastrectomy.

I shall not comment on the abnormal anatomical defects which produce postgastrectomy dumping syndrome, since this has been discussed many times before. I would rather devote my short discussion to the postoperative defects related to nutrition, particularly that of fat.

Though the major cause of postgastrectomy undernutrition is inadequate food intake, malabsorption and maldigestion of fats and proteins contribute to the malnutrition in approximately 20 to 30 per cent of the patients.

Bypass of the duodenum reduces the production of those enzymes which stimulate the flow of bile and pancreatic juice, and also causes improper and inadequate mixing of the food with bile and pancreatic juice.

Lawrence et al demonstrated a marked decrease of pancreatic secretions when hypertonic solutions were administered into the small bowel. Vanamee also reported on the beneficial effects of giving hydrochloric acid in postgastrectomy steatorrhea, and thought hydrochloric acid evoked the production of secretin, and therefore, an improved flow of pancreatic juice.

Further evidence for the relationship of postgastrectomy steatorrhea to inadequate pancreatic secretions is seen in the work of Singleton. This group, by the use of I^{131}-labeled oleic acid and triolein demonstrated that 50 per cent of these patients with Billroth II operations had high stool radioactivity, and that 38 per cent showed fat excretion equal to 25 per cent of that ingested. They also showed that there was normal absorption of fats but inadequate bile salts and lipase for the adequate splitting of triolein.

Everson and Jared showed by metabolic studies on dogs that gastrectomy of the Billroth II type caused a 24 to 32 per cent loss of protein and fat.

In our own experience with subtotal gastric resections of the Billroth II type, 55 per cent maintained preoperative weight levels, but one-third of these were below minimal weight before surgery; 15 per cent gained weight; and 30 per cent lost weight. Of the 30 per cent who lost weight, 16 per cent had significant steatorrhea which did not respond to increased feedings of protein and fats, or to various pancreatic and bile salt preparations. Two of these 5 patients had reached the point where they felt much worse after surgery than before the operation and were sorry they had submitted to the operation.

These five patients with steatorrhea were placed on a new, high potent lipase activity extract, which is known as pancreatic enzymes concentrated*. The extract is supplied in capsules of approximately 300 mg. each; each capsule contains 2,000 units of lipase activity having the digestive power for 18 gm. of dietary fat; trypsin, having digestive power for 34 gm. dietary protein; and amylase, having digestive power for 40 gm. of dietary starch.

*Pancreatic enzymes concentrate, "Cotazym" was supplied by Mr. Kenneth Ericson, Director Professional Services, Organon, Inc., West Orange, N. J.

The lipase activity of the extract was determined by a method based upon the liberation of glycerol from fat hydrolysis. One unit of lipase activity will hydrolyze 7-8 mg. of fat.

Two to three capsules were given with each major meal and one with each large between-meal feeding. Each patient was observed and weighed at regular periods, and the stools were examined for fat. Careful attention was paid to maintaining a diet with five feedings, high in protein and fat, and equal to about 2,500 calories per day.

The summary of the 5 cases studied is as follows: Five patients with weight losses of from 9 to 45 pounds, with definite evidence of steatorrhea, loss of appetite gained from 11 to 33 pounds in from 2 to 8 months of Cotazym therapy with complete disappearance of steatorrhea occurring in from 3 to 5 weeks of therapy.

The criteria of success of an operative procedure for peptic ulcer should include with the incidence of recurrent ulcer, the evaluation of the postoperative nutritional status, incidence and degree of dumping, and other dysfunctions of gastrointestinal physiology.

Though most patients are benefited by subtotal gastric resection for peptic ulcer, from 70 to 85 per cent, we still must seek other surgical procedures which interfere less with the normal gastrointestinal physiology. Until then, we must implement the abnormal physiology of gastric resection with careful frequent clinical observations, continuous patient care, and more supplementary therapy.

INTRAGASTRIC pH DETERMINATIONS*

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Introduction

This report is based on an investigation of the intragastric pH changes in 45 cases. Out of these eight were active duodenal ulcers, three were females and five were male patients. Of the 13 healed ulcer patients, six were females and seven were males. In the hyperacidity group there were four males and four females. Three patients in this group were diabetics. There were 12 normal cases (no symptoms), six males and six females. Of the low acidity cases all four were females. The age range was between 20 and 71 years of age. All of the above mentioned cases had at least two pH determinations on two different days. The intervals varied from a few days to two weeks. The eight active duodenal ulcer cases had three determinations each at intervals varying from a few days to a few weeks. All told there were 98 tests on 45 patients.

Technic

The technic used in the above procedures was as follows:

Step 1:—Apparatus standardized with known pH buffers pH6 and pH8. Corrections made for 37 degrees C. buffer solution was hand-held to approximate intragastric warmth.

Step 2:—Patient is given a cube of ice to suck on to reduce throat, pharyngeal and esophageal sensitivities.

Step 3:—Intragastric electrode is dipped into a tube of KY jelly entering the full length of the tube. This gives ample lubrication. The electrode is then passed through the nostril that is relatively more patent. The tip of the electrode is guided along the floor of the nose. When the tip of the electrode is within the nasopharynx, the patient is encouraged to suck the cube of ice more actively. The swallowing process creates a vacuum in the pharynx and facilitates the progress of the electrode so that it enters the esophagus and not the larynx. Watch for a slight resistance when the tip of the electrode reaches the posterior wall of the pharynx and watch for respiratory distress which occurs when the tip enters the larynx. When this happens the electrode must be immediately withdrawn at least an inch or two to prevent irritation of the larynx and the patient is encouraged to depend on the deglutition reflex to guide the electrode into the esophagus. Also, when the tip of the electrode reaches the esophagogastric junction a slight resistance may be felt.

*Read before the 25th Annual Convention of the American College of Gastroenterology, Philadelphia, Pa., 24, 25, 26 October 1960.

At this point it is not advisable to push the electrode, but preferably give the patient a little water and depend upon the swallowing process to carry the tip of the electrode through the potential sphincter into the stomach proper. The initial pH is observed and to make sure the tip of the electrode is not in the duodenum when the pH reading is high—example 6 or 7. Withdrawing the electrode about an inch or an inch and a half may show a lower pH reading signifying that the tip was distal to the pyloric sphincter. When, however, such maneuver is not followed by a marked change toward acidity or lower pH then we have a right to assume that the high pH readings are due to a low acidity in the stomach.

These maneuvers should be repeated throughout the time that observations are made of the secretory responses to various agents. Readings were recorded in process of this project only after these tests for accuracy were done. Generally a low pH reading does not need much verification. It is only when a high pH reading is obtained that we must make sure that the tip of the electrode comes in contact with the bulk of the gastric contents. For it is conceivable that mucus may prevent the tip from coming in contact with the freshly secreted acid fluid. There is no doubt in my mind that marked fluctuations toward high or low pH's within a few seconds are due to the nonhomogeneous consistency of the gastric contents or difficulty in producing a more uniform mixing.

At times I tried to accomplish this by vigorous abdominal wall mobilization and deep respiratory excursions, but I doubt the efficacy of these maneuvers, for stratification of fluids within the stomach is inevitable. We also must bear in mind that the gastric contents leave the stomach at various intervals according to peristaltic motility or activity. Fleeting fluctuations in pH levels may be due to regurgitation of alkaline duodenal contents.

Observations were made for five minutes after the introduction of the electrode or until a constant pH level was obtained. They were continued for about 20 to 40 minutes after the administration of either a stimulant or an alkalinizing agent. All end points were arrived at after five to ten minutes of unchanged readings.

Comment and Analysis of Results

The eight active ulcer cases all have shown pH's below 2. Administration of insoluble aluminum compounds in varying dosages beginning with 10 grains up to 60 grains did not appreciably raise the pH. Where there was a slight rise it did not last more than a few minutes. The 13 healed ulcer cases did show variations of the pH from 1.5 to 2.5 in a fasting state. Most of these cases reacted to insoluble alkalis practically the same way as the active ulcer cases. Those cases with a pH of about 2.5 showed a rise of the pH in response to 30 grains of aluminum compounds but not above 3.5 and the fluctuations at this level was observed for about five minutes and then returned to the initially observed

low pH. The eight cases with hyperacidity without evidence of ulcers responded to attempted neutralization with insoluble aluminum compound similarly to the active and healed cases except that when 30 grains of alkalinizing substance was given some of these cases showed a rise to a pH of about four; fluctuation took place between 3.0 and 4.0 for about five minutes and then within ten minutes more the original low pH returned. The 12 normal cases without gastrointestinal symptoms on fasting showed pH's ranging from six to three. The cases showing pH's above four were given juices, wine mixtures of 6 per cent alcohol content to produce low pH reactions in order to test their ability and range of response to insoluble aluminum compounds. The patients invariably showed a mild rebound acidity, namely, after the stimulating fluids were given, those with the high pH began showing low pH's down to about 2.5 and upon giving 10 and 20 grains of insoluble aluminum compound there was evidence of prompt neutralization and rise of the pH level up to about the original level that was observed, prior to giving the stimulating fluid. At times the cases showed a pH of around 3.5 to 4.5 for about 15 minutes and then gradually returned to the originally observed pH with a tendency to fluctuate about one-half to one degree. Below this, fluctuation is too small to be deemed as rebound acidity as it is within the experimental fluctuation of the gastric pH observation. A few cases in this group which showed pH's around 3.0, plus or minus a half, did show a mild rebound phenomenon in response to the alkalinization with insoluble aluminum compound so that the end-point reached was one to two degrees below the originally observed level.

Projected Possibilities

The aforementioned data suggests the possible use of the intragastric pH determinations as a method capable of demonstrating the presence of incipient malignancy of the stomach.

Long before the usual diagnostic methods yield positive findings, we might be able to give the benefit of surgery before insidious or overt metastases establish themselves. As a rule even if an asymptomatic gastric lesion (malignancy) is demonstrated by means of one or more of the following diagnostic procedures, x-rays, intubation, abrasion, endoscopic and whatever chemical means there may be available of value, it is common knowledge that most of these patients have already either undetectable dissemination or demonstrable metastases. Furthermore, as we so often find a reluctance on the part of the patient to accept surgery for various reasons, it occurs to me that the difficulties of indecision, fear and pessimism might be obviated, if, some special diagnostic procedure would be used. A procedure basically painless, inexpensive, not time-consuming and yet capable of yielding objective, self-evident data. A graphic demonstration to the patient that the functional integrity of his gastric mucosa, having been normal as established and demonstrated by the occasional or yearly "ideal" test in the past, and if this same procedure should reveal a precipitous drop in the

secretory efficiency of the gastric mucosa it may be easier to prevail upon the patient to accept surgery. If repeated tests show a pH of the fasting contents of the stomach to vary but very little along with the pH response to standard stimulants and quantitative alkalinization we could then expect that these graphs represent a true qualitative and quantitative evaluation of gastric function. Furthermore, simultaneous determination of the enzymatic activity as well as microscopic and physical and chemical information that are made available by means of the well established data obtained with the Levin Tube Method, this impartial and objective data may help to convince a timid patient that a timely surgical intervention is justified by the findings, and, we may be justified to hope for a cure beyond the usual five years.

Of course an additional intermediate diagnostic procedure may be advisable when marked deviations from an established pattern are observed. For example: endoscopic examination with or without specimens obtained by abrasion or biopsy. These old and new procedures would then become mutually and reciprocally corroborative and when a reasonable amount of statistics becomes available, we may be in a better position to limit these diagnostic procedures to a group that gives the most reliable results with a minimum of discomfort or cost as well as a minimum of exposure to radiation. Such a beneficial procedure may well emanate from observations along lines indicated in the above procedures.

Summary and Conclusion

Based on data obtained as outlined above the following conclusions suggest themselves:

1. That by and large patients have a relatively constant fasting gastric secretory pattern.

2. The four cases with low acidity responded to either juices, wine and in one case with a pH of 7.0 histamine had to be used. These cases when given 20 drops of dilute HCl in two ounces of water did not show appreciable lowering of the pH. Yet it is noteworthy to point out that these patients having used dilute HCl with their meals for one week showed marked improvement of gastric mucosal function as evidenced by gastric acidity ranging from 2.5 to 3.5 after one week of HCl therapy.

3. Normally functioning gastric mucosa does not show fixation of pH's at any one level. This observation may serve as a criterion during observation of known gastric carcinoma cases.

4. I believe that the data obtained from the above 45 patients justifies a tentative conclusion that this diagnostic procedure is innocuous and is capable of recording a reproducible functional pattern characteristic of normally functioning stomach. This pattern may serve as a control for any future irreversible changes due to intrinsic pathology of the gastric mucosa.

Discussion

Dr. Henry Colcher (New York, N. Y.):—The study of pH by means of a glass electrode is somewhat different from the study of the electrical potential as such. The electrical potential of the gastric mucosa is done by having a silver-silver chloride electrode connected into a circuit through the entire body and it works in the range of 8 to 70 millivolts. A pH glass electrode is based on the phenomenon that a potential across the glass is developed when it is immersed in various acidities and the range is 62.5 millivolts per unit. It is an extremely convenient method of studying *in vivo* the presence or absence of acid. We have used it in patients where the problem of pernicious anemia versus nutritional anemia exists where you want to establish *in vivo* the ability of secreting acid. It is a simple procedure, in situations where people after subtotal gastrectomy do not have gastric acid juice. It is obvious that with this method of having a glass electrode in the stomach you can detect the secretion of acid even though it will later on be mixed with other neutralizing substances and, therefore, be hidden.

I am delighted to see that other people have the enthusiasm of using these simple methods of passing a glass electrode into the stomach and applying it to various clinical problems.

I would like to bring out one problem that we are studying now which goes with the problem discussed all along this morning. We are using a similar method of a glass electrode in the esophagus kept at various levels, either at just above the gastroesophageal junction or in the middle of the esophagus, and we create gastric regurgitation by the means that were described this morning and study the phenomenon as to how long acid is tolerated by the esophagus.

It appears that patients who have normal esophageal behavior will chase down the gastric juice extremely rapidly, within 6-7 seconds. Patients with esophagitis, patients with hiatus hernia and symptoms often keep the gastric juice at these high levels of the middle esophagus or even upper esophagus for longer periods. The system of studying it is a simple one with the glass electrode, as was mentioned by Dr. Leavitt, connected into a circuit with a recording instrument which allows recording the duration of the acid in the esophagus at that level.

I believe that if more clinicians were willing to undertake these simple methods perhaps a great deal of information would become available.

CHANGE AND PROGRESS IN GASTROSCOPY*

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The object of this paper is to acquaint the clinician with the progress made in gastroscopy. This is important because most of the instruments being used are not too reliable due to technical limitations. The reason for this is that important advances made in the gastroscope are relatively very recent and clinicians have not had the opportunity to familiarize themselves with these developments.

The most striking advances are: the Bernstien[1] modification of the "head" of the instrument which can give us good vision even on contact with the gastric mucosa: the suction biopsy of Tomenius[2] which can take multiple specimens: the excellence of gastroscopic photography and the experimental extremely flexible fiber endoscope[3]. All these, no doubt, will greatly enhance our diagnostic acumen and the term, endoscope instead of gastroscope will eventually be used, because our field of vision will extend to include the esophagus and possibly, the duodenum and small intestine in the near future.

Regardless, however, of the improvement we institute, whether we use a lens system or fiber optic instrument, any changes made must be evaluated according to contributions they make toward the following:

1. Minimizing the hazards to the patient.
2. Improving the clarity of vision.
3. Elimination of the "blind areas".
4. Efficacy of biopsy.
5. Improvement of gastroscopic photography.

1. Minimizing the hazards to the patient:—One of the important improvements in this category is the reduction of the diameter of the lens system instrument from a standard 13 to 8½ mm. The metallic portion containing the prism and lamp is not only smaller in diameter but its length has been reduced from 1⅞ to 1½" and it can be made still shorter to about one inch. This not only facilitates introduction of the scope but in addition, minmizes the hazard of perforation at the hypopharynx. The smaller diameter leaves ample room to add a biopsy or other modality to the instrument without creating any undue discomfort to the patient. Greater flexibility of the fiber endoscope may not only simplify the passage of the scope but will cause less discomfort to the patient during the examination, especially, those with short necks or protruding dentures.

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2. *Clarity of vision:*—All the lenses are now coated and the light source is ample. In addition, a focusing device has been added to the eye-piece. All this has resulted in excellent visual acuity. On the other hand, the clarity of vision through a fiber scope is not as good, and at present, fragmentation of fibers tend to cause black specks to appear in the field of vision.

3. *Elimination of the "blind areas":*—The gastroscopist has been hindered in his examination by several blind areas in the stomach, so that in some instances, almost one-half of the gastric mucosa was not seen, however, with the development of a controlled angulation of the tip, first by Taylor[4] in 1941 and later modified by Chamberlin[5] in 1950, elimination of some portion of the blind areas was achieved and now with the introduction by Bernstien et al[1] of a more recessed lamp close to the mirror, a good image is transmitted even when the mucosa is in contact with the objective of the scope. This further cuts down the blind areas, especially that of the posterior wall. The latter improvement also contributes greatly toward viewing the cardia and esophagogastric junction and the mucous membrane of the esophagus. Even with the aforementioned accomplishments, a variable portion of the prepyloric area, greater curvature and fundus of the stomach is still not seen adequately. This latter difficulty will probably be overcome by the ability of the fibre scope to snake its way into these areas.

4. *Biopsy:*—One cannot overemphasize the importance of biopsy in the correlation of the gross appearance of the mucosa as seen on gastroscopy with the microscopic findings. Although, in some instances, a well trained endoscopist can differentiate grossly the various lesions of the stomach, still, a biopsy is not only confirmatory, but is essential in the differentiation between certain benign and malignant lesions such as tumors, giant rugae, lymphomas and gastritis. The types of biopsy available at present are:

A. *The Benedict gastroscope:*—This has a punch biopsy forceps attachment, which can be controlled under vision. Benedict has reported uniform good results with it. Although, we have had this instrument for several years, we use it only on occasion, because it has several disadvantages. First, the diameter of the instrument is increased to 15 mm. This increases the difficulty of introduction and discomfort to the patient, thus increasing the hazards to the patient. Then the biopsy taken by this type of forceps, usually is small and inadequate and only a single specimen can be taken at a time.

B. *The suction biopsy of Tomenius-type*[3] can now be attached to a standard scope. Its advantage is that it can take multiple biopsies and the specimens are usually adequate (2-3.5 mm.). Its disadvantage in its present form is that the present scope is in a relatively fixed position and it cannot be directed toward the lesion, the stomach therefore has to be collapsed to bring the mucosa close to the instrument for the biopsy to be taken. This not only precludes vision of the area to be taken, but certain regions cannot be reached. A contact vision

instrument, however, with a controlled angulation tip containing the suction biopsy would do away with some of these difficulties. The extremely flexible fiber scope with controlled angulation could conceivably reach all areas and therefore have a great advantage over the lens system instrument.

5. *Improvement of gastroscopic photography:*—For the past 15 years, numerous attempts have been made to photograph the interior of the stomach through a gastroscope by attaching a camera to its eye-piece. This, however, has met with limited success. The repeated failures encountered were due to the fact that the light source was too poor and the exposure time too long, being one to two minutes and this resulted in about 10 per cent good pictures. In 1948, however, Segal and Watson[7] improved the technic greatly so that good colored photography was obtained in 61 per cent of their cases. About two years ago, Debray and Housset[8] introduced a gastroscope with an electronic flash lamp which reduced the exposure time to 1/1000 of a second. Excellent Kodachrome pictures resulted with uniform success. During the viewing procedure, a 6-volt bulb was used and during the flash, it is increased to 180 volts D.C. An intriguing demonstration of an extremely small gastric camera about the size of your little fingernail was presented at the World Congress of Gastroenterology in 1958 by Tasaka and Ashizawa[9]. This was placed adjacent to the ordinary 8-volt Tungsten bulb, exposure time is only 1/10 second, the light source being close to the camera and only about 30 volts is used. Excellent Kodachrome pictures were taken in this manner. It is conceivable that such a small camera can be attached just above the light source of our standard gastroscope. At present, this gastrocamera is introduced into the stomach and photographs are taken blindly by a control outside of the body. Another achievement is the pioneering effort made in cinegastroscopy by H. Colcher[10]. He has demonstrated that it is feasible to take moving pictures through the gastroscope and this opens up a new possibility for research and teaching of the gastric physiology.

Summary

Recently, several important advances have been made which will greatly improve the efficiency of gastroscopic diagnosis. Modification of the "head" of the instrument has eliminated some of the major blind areas and has resulted in more extensive visualization of the gastric mucosa. Better biopsy devices have been introduced and greatly improved gastroscopic photography has been achieved. Knowledge of these improvements will stimulate a greater use of improved instruments and this will result in better gastroscopic diagnosis.

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Discussion

Dr. Louis Koolpe (Philadelphia, Pa.):—Dr. Barowsky has adequately summarized the major important advances in gastroscopy. One must, however, always keep in mind that the gastroscope is only as efficient as the operator and his skill, no matter how far advances are made in the technic of gastroscopy, and that it plays in addition to all the clinical findings, a very small portion in total diagnosis. That small portion, however, can be extremely important in the indicated case.

That is where the clinician must decide when to employ these new advances and when not to.

In line with the advances that have been made, Schindler and his co-worker, in 239 cases have made accurate diagnoses; 191 as benign cases, 48 as malignant, in a discussion of gastric ulcer.

In breaking that down among 20 evaluated incorrectly, 18 diagnosed as malignant were benign; 2 diagnosed as benign were malignant.

Among 14 with indefinite classification 9 were benign and 5 were malignant. The diagnostic error was not only low, but it was chiefly in over-diagnosing rather than under-diagnosing.

This is something that, with clearer views in the new advanced instruments, we may be able to overcome.

Again, as Dr. Barowsky pointed out, inadequacy of visualizing certain areas of the stomach was one of our greatest drawbacks in gastroscopy. We still have an area, as he demonstrated to you, in the lesser curvature, prepyloric area which is not adequately visualized.

There some of our greatest mistakes are made.

In discussing the advances with the unified head of the instrument it should be noted there is also a reduction in the amount of heat produced by these instruments. In so doing we have been able to overcome, to a large extent, some

of the coagulation that occurs on the head of the instrument during the actual examination.

That can be an important feature because I think we've all seen cases where with coagulated mucus and blood the field is entirely destroyed and the value of the gastroscopy is nil; the instrument must be withdrawn, re-introduced, if the patient is cooperative and if not, abandoned altogether.

Even in introducing these new instruments there is one danger that still remains where something could be done and that is at the gastroesophageal junction or just proximal to it. Where the bend in the esophagus occurs instruments still are known to produce traumatic lesions with rupture of the esophagus.

The rubber finger introduced under the gastroscope many years ago was a great advance in that respect, but there still are dangers when the solid portion of the instrument strikes that area of the esophagus.

Those are things that we can still think about for the future in addition to the advances already presented today.

Dr. Harry Barowsky (New York, N. Y.):—I want to thank Dr. Koolpe for his discussion and I would like to comment on some of the problems that he raised.

First of all Schindler's statistics were based on the use of older instruments and not on our advanced gastroscopes and they did not include biopsy studies.

Second, I want to mention that coagulation of mucosa that we see occasionally on our lamp is not a common experience. I'd like to stress that, because some of you may have thought otherwise from what the previous speaker has said.

Third, the esophagogastric junction is quite easily passed now with the new instruments since they have a smaller diameter and greater flexibility.

THE RELATIONSHIP OF VIRAL HEPATITIS TO CIRRHOSIS OF THE LIVER*

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The aim of this study is to explore the possible relationship between viral hepatitis (both infectious and homologous serum hepatitis), cirrhosis of the liver and cancer of the liver. This initial study confines itself to an examination of interrelationship between the first two diseases.

Recent studies by the authors have described a hemagglutination phenomenon noted in blood serum from patients with viral hepatitis[1-4]. This phenomenon has been confirmed by other investigators in three separate instances[5-7].

Satisfactory evidence to show the relationship of viral hepatitis to subsequent development of cirrhosis of the liver has been reported in a significant percentage of cases[8]. This is well documented in the European literature, particularly in the Scandinavian countries[9]. Numerous reports in the literature describe a considerable incidence of acute infectious hepatitis in the etiology of cirrhosis of the liver. Postnecrotic cirrhosis (posthepatic) is well established as the sequel to infectious hepatitis[10].

Many cases are reported in the literature in which serial biopsies of the liver studied in the course of infectious hepatitis revealed the development of portal or Laennec's cirrhosis as well as the well-known variety of postnecrotic or posthepatic cirrhosis of the liver[11,12].

This proposed study in principle further explores the currently held possibility of the relationship between viruses and the development of cancer. Since the literature is well documented as to the possible relationship of viral hepatitis and its subsequent development to cirrhosis of the liver—and the well-known association of cirrhosis of the liver with primary cancer of the liver, it is the authors' belief that these three related problems present an extremely interesting possibility as to mutual interrelationship.

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Numerous investigators have presented evidence which lends credence to the concept that many primary hepatic neoplasms reflect cytologic aberration supervening upon hepatic repair and regeneration predominant among the postnecrotic and posthepatic varieties of cirrhosis of the liver[13].

Approximately 75 per cent of cases of hepatoma appear in association with preexisting cirrhosis of the liver[14,15]. Cirrhosis of the liver is associated with primary carcinoma of the liver in up to 82 per cent of cases. Association of carcinoma with postnecrotic cirrhosis is also well documented.

The incidence of hepatocellular carcinoma in white patients with cirrhosis is 2.8-6.2 per cent or at least 20 times more common than in patients without cirrhosis[16].

Examination of a relationship between cirrhosis of the liver of viral origin and primary cancer of the liver will be developed in subsequent communications.

The hemagglutination reaction has been noted in this series of patients who have had viral hepatitis during periods of time up to 20 years' duration, prior to testing. A significant number of these cases therefore suggest a "carrier" state of viral hepatitis, an observation already confirmed and undergoing further study by Rubin, Kemp, and Bennett[5].

In preliminary observations regarding the transmissability of viral hepatitis by these carriers through blood tranfusions, these latter authors indicate a significant percentage of transmission of this disease via blood donors with high titers of the hemagglutination reaction. We have found and reported high agglutination titers for viral hepatitis in sera from proven viral hepatitis cases supplied to us by the Infectious Disease Section of the United States Public Health Service at Chamblee, Ga. through the courtesy of Dr. Gerald Cooper. A considerable number of these sera were stored in refrigeration for three years prior to testing. Havens[6] recently reported high agglutination titers in sera from patients with acute viral hepatitis which had been stored for periods of up to eight years. These observations suggest the feasibility of testing both blood sera and liver tissue for the hemagglutination reaction of viral hepatitis in patients with primary cancer of the liver and cirrhosis of the liver for past evidence of viral hepatitis.

Recent studies on the hemagglutination reaction in viral hepatitis by Havens[6] and McCollum et al[7] have confirmed this hemagglutinating phenomenon but reported superior results with chick erythrocytes in lieu of M. rhesus erythrocytes as the antigenic agent in this reaction. Rubin, Kemp and Bennett[5] as well as we[3,4] have reevaluated the M. rhesus erythrocytes in this reaction (in 478 new human subject controls). These findings again show that in our experience and with our technic the M. rhesus erythrocytes give the best results for hemagglutination; Rubin et al[5] again report and confirm this observation. Undoubtedly,

differences in technic must account for differences in results with chick and M. rhesus erythrocytes.

The following data are presented utilizing the method most recently described by us[4] and by Rubin et al[5] in studying hemagglutination in human viral hepatitis. Hemagglutination titers of 1:8 or higher are considered as positive reactions for viral hepatitis.

Clinical Material

An investigation was made of 33 patients with chronic hepatitis and/or cirrhosis of the liver, demonstrated to be of viral etiology. Both the infectious hepatitis virus (30 patients) and the homologous serum virus hepatitis (3 patients) forms were concerned. A control series of 33 patients with cirrhosis of the liver of nutritional, alcoholic etiology was also studied. A third series of 33

TABLE I

Summary

Hemagglutination Reactions for Viral Hepatitis in 33 Patients with Chronic Hepatitis and/or Cirrhosis of the Liver Symptoms of 3 to 23 Years' Duration

No. of cases	Male	Female	Average age	Average duration of symptoms	History of painless jaundice	Biliary tract signs	Positive hemagglutination reactions (1:8 or over)	One or more positive liver function tests
33	15	18	46	6.75 yrs.	14	19	27	28

patients with chronic viral hepatitis acted as a second group of controls, to be described as follows:

The diagnosis of chronic hepatitis of viral origin was established in this study on the basis of the following six criteria.

1. No history of alcoholism in any patient.

2. A history of one preceding acute episode of painless jaundice with spontaneous recovery in a significant percentage of cases.

3. Persistence or chronicity of gastrointestinal and/or generalized or systemic symptoms in the majority of patients.

4. Abnormal biliary tract signs to physical examination in most or in the majority of patients.

5. Abnormal liver function tests in a high percentage of cases.

6. Positive hemagglutination reactions in at least 80 per cent of patients.

Table I summarizes certain significant features of the 33 patients in the chronic hepatitis or cirrhosis of the liver group of viral etiology. In this series the distribution of sexes was approximately the same, with 15 male and 18 female patients, whose ages ranged from 22 to 93 years with an average age of 46 years. The range of duration of symptoms was from 3 to 23 years with an

TABLE II

HIGH HEMAGGLUTINATION TITERS IN VIRAL HEPATITIS IN 12 PATIENTS WITH CHRONIC HEPATITIS AND/OR CIRRHOSIS OF THE LIVER SYMPTOMS OF 3 TO 21 YEARS' DURATION

No. of cases	Male	Female	Average age	Average duration of symptoms	History of painless jaundice	Biliary tract signs**	Hemagglutination reactions of 1:32 or over	One or more positive liver function tests
12	5	7	45 yrs.	6.25 yrs.	3	6	1:32 9 1:64 3	9

**Biliary signs—enlarged liver or icterus.

average of 6.75 years. Fourteen patients gave a preceding history of painless jaundice (42 per cent). Nineteen patients (57 per cent) had biliary tract signs, either of palpable enlargement of the liver or frank icterus.

Continuing the analysis of this group of subjects, 28 or 85 per cent demonstrated at least one definitely positive or abnormal liver function test. The majority of cases had two abnormal liver function tests. These latter consisted

TABLE III

HEMAGGLUTINATION REACTIONS FOR VIRAL HEPATITIS IN 33 PATIENTS WITH CHRONIC HEPATITIS AND CIRRHOSIS OF THE LIVER OF NUTRITIONAL (ALCOHOLIC) ORIGIN

No. of cases	Male	Female	Average age**	Average duration of symptoms	Painless jaundice	Biliary tract signs	Positive hemagglutination reactions (1:8 or over)	One or more positive liver function tests
33	16	17	51 yrs.	5 yrs.	—	22(66%)	2 (6%)	20 (60%)

**Range 1-20 years.

of thymol turbidity, cephalin flocculation, serum bilirubin, icterus index and bromsulfalein dye excretion tests. In some cases, urobilinogen and serum SGO transaminase and SGP transaminase determinations were made.

Positive hemagglutination reactions for viral hepatitis were found in 27 (82 per cent) of the patients.

No apparent differences were noted clinically or through laboratory studies between the infectious and the homologous serum hepatitis patients.

A group of 12 patients selected from the preceding group of 33 cases is summarized in Table II. Here, very strong or high hemagglutination titers in viral hepatitis subjects were examined. It is noted that 5 males and 7 females constituted this group in which the average duration of symptoms was six years with a range of 3 to 21 years' symptomatic history. The age range was from 22 to 73 years with an average of 45 years. Three of these subjects only gave a history of preceding painless jaundice and 9 cases revealed one or more positive or abnormal liver function tests.

The hemagglutination reactions for viral hepatitis with titers of 1:32 were positive in 9 cases; 3 cases were positive with titers of 1:64 or over. These intense positive reactions on an average of six years following the onset of biliary tract symptoms are of particular interest.

TABLE IV

CONTROL SERIES OF 33 PATIENTS WITH CHRONIC HEPATITIS OR CIRRHOSIS OF THE LIVER SUBJECTS WITHOUT HEMAGGLUTINATION REACTION STUDIES

No. of cases	Male	Female	Average age**	Average duration of symptoms	History of painless jaundice	Biliary tract signs	One or more positive liver function tests
33	15	18	57 yrs.	13 yrs.	8	23	21

**Ranges from 4 to 33 years.

A summary of the first control series of 33 patients with cirrhosis of the liver of nutritional, alcoholic origin is presented in Table III. The distribution of sexes was approximately the same, with 16 male and 17 female patients, whose ages ranged from 30 to 70 years with an average of 51 years. The range of duration of symptoms was from 1 to 20 years with an average of 5 years. None of the patients gave a history of painless jaundice. Twenty-two patients (66 per cent) had biliary tract signs or symptoms and 20 patients (60 per cent) demonstrated at least one positive or abnormal liver function test. Only two patients in this series revealed positive titers of 1:8 or higher. One of these patients had an associated chronic, nonspecific ulcerative colitis; the other patient gave a history of having had multiple blood transfusions. The incidence of negative hemagglutination viral reactions in this control group is therefore 94 per cent. These findings in this form of liver disease were also confirmed with the hemagglutination reaction by Havens and McCollum et al.

A summary of the second control series of 33 patients with chronic hepatitis and/or cirrhosis of the liver of nonalcoholic or viral etiology is presented in Table IV. These patients were studied under analogous conditions with the

exception that they chronologically preceded the patients described in Table I and no hemagglutination studies were carried out in these subjects. It is noted from this table that the age, sex, duration of illness and other tabulative features are of a similar character described in the preceding tables. In this series of patients two were diagnosed as homologous serum hepatitis cases and the remainder as the infectious hepatitis form. No discernible clinical or laboratory study differences of significance were apparent.

Comments

The series of 33 patients of chronic viral hepatitis or cirrhosis of the liver of viral etiology was entirely free of any history of alcoholism in each subject. Four patients in this series were subjected to biopsy of the liver on the operating table during exploratory surgery of the biliary tract or through transabdominal needle biopsy. In each instance, extensive, nodular, postnecrotic, fibrotic changes typical of cirrhosis of the liver were found similar to those shown in the accompanying photomicrographs.

In keeping with the findings of pathologic liver changes in the histologic examinations of our cases, Stokes[17] has stated that chronic viral hepatitis "in older persons may continue as a subacute or chronic infection, with a tendency to relapse and to fibrotic changes in the liver. Serum hepatitis, particularly in older persons, also shares the tendency to chronicity, severe relapse, and fibrosis of the liver". Further confirmation of these impressions has also recently been reported by Balo et al[18], who reported the finding of histologic transition from virus hepatitis in 20 cases out of 57 cases to cirrhosis of the liver. There was a comparable distribution of cases corresponding to the classic Laennec's cirrhosis and the coarse nodular form of cirrhosis. The manifestations of connective tissue increase and parenchymal regeneration was equally present in all cases which showed diffuse inflammatory changes.

Since the literature indicates that approximately 5 per cent of chronic viral hepatitis patients show a tendency to relapse clinically, and of this 5 per cent some 20 per cent go on to chronic hepatitis or cirrhosis of the liver, the public health importance of these findings is significant[19].

One clinical finding noted in our series of chronic viral hepatitis is the persistence of so-called psychosomatic symptoms characterized by nervousness, depression, anxiety, weakness, loss of ability for mental concentration, insomnia, and other emotional disorders. Some manifestations of these nervous symptoms appeared in virtually every patient. These observations may be particularly significant in the light of the fact that a very large number of patients suffering from acute and chronic viral hepatitis while in the military service of the United States during World War II displayed identical symptoms. Before the true nature of the viral hepatitis was discovered, it was estimated that many thousands of such patients were discharged from military service with the diagnosis

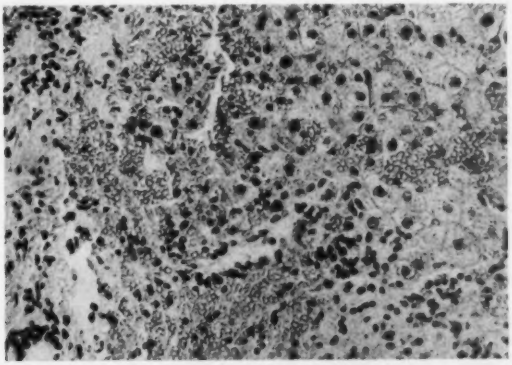

Fig. 1

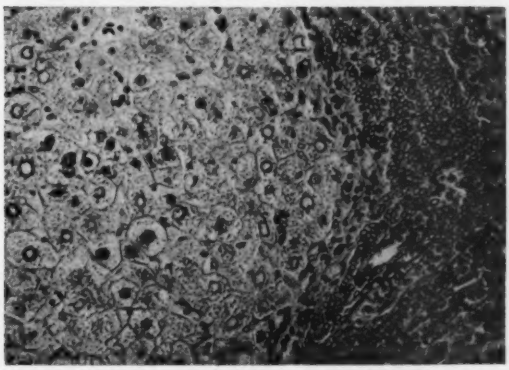

Fig. 2

Fig. 3

Figs. 1, 2 and 3—The periportal triad areas (Glisson's capsule) show an expansion due to marked increase of lymphocytes with a lesser increase of fibrous matrix. Clumps of liver cells are isolated by the expanding capsule and also narrow strands of thickened intralobular connective tissue and lymphocytes are seen to isolate the hepatic lobules into a monolobular pattern of cirrhosis. The lobules themselves show only mild anisonucleosis and are generally uniform in structure with regular orientation of sinusoids and hepatic cell cords.

of "psychoneurosis". This latter diagnosis was altered in subsequent years in most patients, according to reports following the discovery of the viral etiology and liver involvement of the condition. These findings suggest further consideration of the neurotropic aspects of the causative virus in acute and chronic viral hepatitis.

In view of the results indicating that 82 per cent of our series of chronic viral hepatitis show hemagglutinating activity for viral hepatitis, the public health aspects of the carrier state in this disease deserves consideration.

Summary and Conclusions

1. A series of 33 patients with chronic hepatitis or cirrhosis of the liver of viral origin was found to have abnormal liver function tests with signs and symptoms referrable to the biliary tract of three to 23 years' duration in the majority of cases.

2. Abnormal liver function tests were present in 28 (85 per cent) patients.

3. The hemagglutination test for viral hepatitis was positive in 27 of these cases or 82 per cent of the total.

4. Four of these patients had biopsies of the liver. Each was found to have similar, characteristic, extensive cirrhosis of the liver.

5. A control series of 33 patients with alcoholic, nutritional cirrhosis of the liver was studied under the same conditions. Thirty-one (93 per cent) cases were found to have negative hemagglutinating reactions for viral hepatitis.

6. These studies suggest that a significant number of patients with chronic signs and symptoms of infectious hepatitis or homologous serum hepatitis have:

a. Persistent abnormal liver function

b. Persistent viral hepatitis activity suggestive of a carrier state, and that such patients may

c. Show pathologic changes in the liver characteristic of transition to cirrhosis of the liver.

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Discussion

Dr. Harman A. Shecket (Cleveland, Ohio):—I want to thank Dr. Morrison for this very stimulating paper. I have the impression that Dr. Morrison quotes relapses of five per cent, suggesting chronic hepatitis in five per cent of a series of acute viral hepatitis cases, and that one out of four of this group may go to cirrhosis of the liver. I must disagree. In World War II I was concerned with Army studies of acute infectious hepatitis. A small percentage, less than one per cent, we felt, went to chronic hepatitis. One third of one per cent or less showed symptoms suggestive of a cirrhosis of the liver. Subsequently over the years since World War II, I have been associated with the United States Veterans Administration studies relative to compensation in these thousands of soldiers who had viral hepatitis. The number is small, according to the VA experience, of chronic hepatitis resulting and the number is more minute in individuals demonstrating at this time, which is now many years, cirrhosis of the liver.

A few years ago I was involved in a study of infectious mononucleosis, a study of 135 cases from a private hospital, Mt. Sinai Hospital; a big city hospital,

Cleveland City Hospital; and Veterans Administration cases. We found 90 per cent of these people had involvement of the liver, a large liver palpable and abnormal liver function tests. When we consider 1. the large numbers of infectious mononucleosis cases that we see in young; 2. the large number of hepatitis cases that we can demonstrate with jaundice and 3. the large number—maybe 15 per cent or more—of hepatitis without jaundice that we may not diagnose, it would seem that the percentage of people who go to chronic liver disease and the percentage that go to cirrhosis of the liver must be rather small.

The aspect of psychosomatic symptoms in liver disease is a very interesting one. In our war experience in a large general hospital of over 2,000 beds we saw many instances of psychoneurosis diagnoses made in which, on examination, we found infectious hepatitis. There is a very strong correlation between liver disease and these psychoneurosis symptoms. This is a very interesting field.

In the Army, yellow fever vaccines were given with resultant homologous serum hepatitis in a large number of cases.

At the end of the war the Navy tried an antiflu serum. They made the same mistake as the Army did and used human serum. The result was a large number of cases of homologous serum hepatitis in the Navy. We were involved in that study.

All in all, we have the impression that there has been a large number of individuals involved with hepatitis—both homologous serum and infectious hepatitis. The percentages with chronic hepatitis and cirrhosis of the liver would seem to be small. That we may demonstrate some autoimmunization reactions and hemagglutination factors in cases with cirrhosis of the liver is certainly present and interesting, but whether this would occur due to other things than infectious hepatitis is to be considered.

Dr. Frederick Steigmann (Chicago, Ill.):—I want to take this opportunity to make a few remarks from our own observations on these cases of chronic hepatitis. I believe it is difficult to compare various statistics of the incidence of chronic hepatitis or cirrhosis following so-called viral hepatitis. They depend upon what group of patients is being tested. Various studies, both by the VA, the Rockefeller Institute and other groups have failed to show a high incidence of so-called cirrhosis following viral hepatitis.

On the other hand, in private practice we more frequently see cirrhosis following viral hepatitis. That may be due to the different types of patients who are being examined by the different groups. It is more likely that chronic hepatitis or cirrhosis will develop later on in patients who are poor material to begin with. In elderly patients, for instance, and in women following the menopause, viral hepatitis may be followed more often by severe chronic hepatitis and cirrhosis. Therefore, it is important to keep in mind, what type of patients were seen whenever one reports incidences of viral hepatitis followed by cirrhosis.

On the other hand, it is also important to realize that as Dr. Morrison has pointed out we do not have sufficient tests at present. Dr. Morrison's test for the hemagglutination helps us in some instances to prove, or at least to show that some of these patients may have a smoldering of the disease and may go on to cirrhosis.

It is important to realize too, as has been shown by many men, that there is some poor correlation between hepatic function and hepatic structure. That means if the patient gives various psychosomatic symptoms and he has had a past history of hepatitis, it is not always sure that his symptoms are due to the hepatitis. If that patient has negative so-called liver function tests, he should not be labeled simply as a neurotic. Sometimes even the biopsy itself may be negative. It must be stressed, however, that if one does peritoneoscopy on many of these patients one will find that one portion of the liver may be completely normal and yet the other portion may be abnormal. Therefore, if the liver biopsy is done and the needle hits a normal part of the tissue of the liver, the tissue may look perfectly normal and yet that patient may have sufficient abnormal liver tissue which will give him symptoms.

I happen also to be a consultant for the VA and I have seen many of the patients who have chronic complaints which may be due to chronic hepatitis. In most instances we go about doing a liver biopsy and also the liver function tests to rule out or rule in their claims for injury following the hepatitis.

On the other hand, in recent years since we have been doing peritoneoscopy I feel that in some instances we may not be doing justice to these patients by ruling out the incidence of chronic hepatitis mainly because their liver function tests or even biopsy is negative. Therefore I do feel the test of Dr. Morrison and perhaps the more frequent use of peritoneoscopy or even surgery, to see how the liver looks grossly in some of these patients may be an important procedure.

Dr. Mitchell A. Spellberg (Chicago, Ill.):—I am very interested in some of the historical aspects of viral hepatitis as well as other diseases. It seems that there is a swing from one extreme to the other. You will remember when Lucke described his classical pathological studies of viral hepatitis shortly after the large epidemics from the use of the anti-yellow fever vaccine, his conclusions were rather dogmatic that the patient either dies or gets well completely, that there were no chronic changes at all. He was dealing with acute material.

Then about five years after the end of the war we saw a good many patients, a good many soldiers, veterans who had a mild viral hepatitis and who came in with evidence of chronic disease, and there was a swing in the other direction. The thought was that perhaps as many as five per cent or more of patients with viral hepatitis developed some type of posthepatitic or postnecrotic cirrhosis.

In the last few years, there is again a swing in the other direction, a question of whether cirrhosis does occur after viral hepatitis.

Dr. Steigmann mentioned some of the studies and also there is a recent study from England in which they sent out questionnaires to a large group of English soldiers who were known to have hepatitis. They were asked how they felt and whether they had any symptoms or whether they were ill, and I think the result was completely negative. Most of those individuals who formerly had hepatitis had no apparent symptoms of cirrhosis.

This type of study I think is faulty in that there can be such a thing as a latent type of cirrhosis which we see, of course, in portal cirrhosis, and I think that is also seen occasionally in posthepatitic cirrhosis. The patient may apparently remain well for an indefinite period of time and perhaps clinically forever, but at surgical procedure or at autopsy he is found surprisingly to have evidence of cirrhosis or suddenly he develops hepatic decompensation or varicose veins and we find that the patient actually has had cirrhosis for a long period of time.

I think there is a considerable percentage, not perhaps as high as five per cent. I think there is also a matter of semantics. If we use the term "chronic hepatitis" as indicating hepatitis which lasts for longer than three months, then perhaps three or four per cent of the patients will have a chronic disease, a lowgrade hepatitis which lasts several months. But the postnecrotic cirrhosis, a true chronic disease, which lasts for years, or, in many cases, kills the patient probably occurs in one per cent or less.

I would like to ask Dr. Morrison one question and I may have misunderstood his statement. Did he mean to say that a patient with posthepatitic cirrhosis means that the patient is still carrying the virus in his blood or in his liver? Is it not possible that it may be a problem of autoclasia that the disease is continued without the presence of the virus by some biochemical process?

Dr. Lester M. Morrison (Los Angeles, Calif.):—I want to thank the discussants very much.

I am sorry that Dr. Shecket experienced some confusion as a result of some of the figures that I presented with regard to the relapse rate. I quoted—time did not permit a careful and a detailed or meticulous representation—the various figures which we have collected in the European and in the American literature showing the relapse rate. This is very high and can vary, as Dr. Steigmann and Dr. Spellberg have described, anywhere from a fraction of one per cent to a relapse rate in some Scandinavian reports, particularly those from Denmark, up to 20 per cent. I just gave you an average from the studies which appear to be important to us and I have presented them to you. Of this five per cent relapse which we were able to gather from the literature some 20 per cent goes on to cirrhotic changes. This is not my personal experience; I give you the quotations and I believe, Dr. Shecket, that the reason for this lack of amplification was that I spoke only of the impression gained from a large number of autopsy reports published abroad and in this country.

I also want to comment on the fact that Dr. Shecket noted that only one per cent, or less, of chronic hepatitis cases tended to relapse in his experience during World War II and that one-third of this one per cent suggested cirrhosis. I would like to tie that in with Dr. Steigmann's very astute remarks in this sense. I also wish to mention his findings of 90 per cent liver involvement during the course of infectious mononucleosis. This points up a fact that has already been described in the literature. A large number of cases of the infectious variety of mononucleosis, or so-called infectious mononucleosis does have impairment of liver function and some of them actually were demonstrated to show early cirrhotic changes.

Regarding our hemagglutinating tests and those which Dr. McCollum reported in the literature—I cannot recall at the moment whether Dr. Havens has studied any of these IM cases. Dr. Havens, were there any?

Dr. Havens:—Yes.

Dr. Morrison:—We found that two out of every five cases tested for hemagglutinating titers in infectious mononucleosis gave us mild to moderate agglutinating titers suggesting that there may be some common or mutual characteristics of both viruses which affect the liver.

Dr. Shecket apparently questioned the extensive occurrence of cirrhosis of the liver. He felt, apparently, that this is a very small consideration. This is the general clinical impression. If, however, you examine the statistics as those that I have looked through in the State of California, they demonstrate that after the rate of death from cardiac and cerebral vascular disease, and, secondly, after cancer, cirrhosis of the liver stands third as a cause of death (in the State of California). These findings are comparable to a great number, if not the majority of other states in the United States.

There is a strong and a growing feeling in the infectious disease units of the federal government that infectious hepatitis is increasing at a very great rate. What is most alarming of all is that the nonicteric form of hepatitis is far greater (at least 60 to 80 per cent greater) in incidence than the frank jaundiced form.

Those findings are very significant; I was glad to hear Dr. Shecket had also remarked on the psychoneurotic manifestations in those cases which he had seen in World War II.

I appreciated Dr. Steigmann's comments because he has had the opportunity of examining patients with viral hepatitis from four different sources: first from his experiences in the Navy where he saw a large number of these cases; secondly, at a large general hospital, Cook County Hospital in Chicago; thirdly, from a very extensive private practice; and fourthly, he has seen them in the Veterans Administration hospitals. I think his experience is an extremely valuable one and a most unusual one.

I think that he has pointed out very astutely that it is difficult to compare statistics because this disease is very variable. Some of the mortality rates in Denmark, for example, particularly in the epidemics affecting women of the younger or the middle aged groups, carry a very high mortality rate in contradistinction to those which are of the type that Dr. Shecket has discussed.

We have studied three epidemics of viral hepatitis and we have reported two of them. The first epidemic which we picked up in Los Angeles in the southern part of the city was carried out in a predominantly Japanese section. There were 364 cases of viral hepatitis reported by the Board of Health and we believe there were many times that number, of course, which were not reported to the Board of Health. We studied some of these and found that this variety was a very mild one. A number of Japanese gardeners were affected and the disease was tracked down to a trailer camp where there was faulty plumbing and sanitation which contaminated the drinking water.

We had another serious type in Pomona at La Verne Junior College, a sectarian institution about 50 miles from Los Angeles in which young people were affected, between the ages of 18 to 22 on an average, those of the usual college age. Here, there were many patients who were disabled, had to go to the infirmary and were ill for a year or two afterward.

A third epidemic which we studied at Oakland, Calif., at the Naval Hospital Base was an interesting variety in Naval personnel and civilians. Here, in the affected children, we saw a different variety which was very mild but still a form in which jaundice was frankly and moderately present. Dr. Steigmann's comments are therefore especially important. Our experience bears him out. It is apparently very difficult to compare one viral hepatitis form with another. There are so many clinical varieties and I am sure that Dr. Havens has noted this in his own studies.

Finally, Dr. Spellberg's comments were also very stimulating. He has also a very great experience with this disease and he too emphasized the different forms and epidemic varieties.

His question is noteworthy about posthepatic cirrhosis: are these patients still carriers? Drs. Rubin, Kent and Bennett have demonstrated that many of these cases may be carriers and are responsible for transmission of this disease through the Red Cross Blood Banks and other blood banks in the Armed Forces. These cases have to be regarded as very active carriers. Whether this is an autoplasic manifestation as Dr. Popper and Dr. Havens remarked earlier in the day, is something that only time will tell; I do not know. All I can tell you is that the particular gamma globulin which we have studied in this disease has a molecular weight of about 800,000 and a flotation rate of 16.6. It may be possible that more antibody-antigens studies will enhance our knowledge of this challenging disease.

LARGE BOWEL OBSTRUCTION*

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Philadelphia, Pa.

Obstruction of the colon is not often as urgent as obstruction of the small intestine but exceptions occur so frequently that no surgeon can afford to be complacent in treating it. Methods of establishing the diagnosis, and preparation of the patient for surgery have become fairly well standardized. Recent experimental work by Atik, et al suggests that time-honored methods of surgical treatment may be subject to review. It is well to remember that catastrophic consequences can result from disregard of established sound surgical principles. Short cuts in patient care are never good economy when they increase patient morbidity and mortality.

Diagnosis

Pain of a colicky nature is one of the cardinal signs of intestinal obstruction. When the pain becomes steady and abdominal tenderness is present the existence of strangulation or localized inflammation must be suspected. Elevation of the pulse rate is another highly significant sign of intestinal obstruction. While this sign is not as sensitive an index in obstruction of the large intestine as it is in the small intestine, a pulse rate over 100 particularly in the presence of a normal temperature should alert one to the possibility that intestinal obstruction is present.

Obstipation, often alternating with diarrhea is another important sign of impending large bowel obstruction. It is remarkable that most people whose bowels have moved regularly for years do not become curious about increasing constipation or other change in bowel habit. Digital examination of the rectum in such cases is still too often neglected by physicians.

Abdominal distention may be quite marked especially if the obstruction lies in the lower colon. Inability to wear a formerly comfortable article of clothing will often call attention to this.

X-ray examination has become a routine requirement in suspected bowel obstruction, large or small. Frequently films made without contrast medium are sufficient for a presumptive diagnosis. A word of warning is necessary in regard to interpretation of x-ray films. We have frequently found that prior to operation in cases of intestinal obstruction the findings are minimal. By the same token in the postoperative period we very often note that there is an unusually large amount of gas present particularly in the small intestine which may be inter-

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preted as ileus. In other words, there is a tendency for the films to minimize symptoms preoperatively, while the reverse is true in the postoperative period. We do not hesitate to use a barium enema judiciously administered, without prior preparation. This will often delineate not only the site and cause of the obstruction but also its degree. Air contrast technics are not employed in the presence of possible perforation.

Preparation for Surgery

It is important for the surgeon to have a standardized routine in evaluation of patients with large bowel obstruction. Similarly the preparation of the patient for surgery, once the diagnosis is established, should also follow a pattern. Variations and exceptions must be made in individual cases but it is wise to obtain basic laboratory studies before taking the patient to the operating room. These should include a complete blood count and urinalysis, blood urea nitrogen, and serum electrolyte determinations. An electrocardiogram should be done. In older patients a blood volume study will often be rewarding. It may indicate the need for blood replacement when hemoglobin and hematocrit values fail to do so. While awaiting the results of these tests fluid is administered by vein and a broad spectrum antibiotic is added to the solution. Four to six hours spent in such preparation is often of greater value than immediate surgery.

It should not be necessary to mention the importance of digital examination of the rectum but each year we see patients admitted with fecal impaction or obstructing rectal carcinoma in whom no such basic examination had been done. When a ballooned empty rectum is encountered, sigmoidoscopic examination comes next in logical sequence.

Each case of colonic obstruction is entitled to a professionally given enema. If no gas is passed, if the enema returns clear, a complete obstruction is present. Such a patient will probably require a preliminary decompressing colostomy.

If it is found that the obstruction is not complete, mechanical and antibiotic preparation for surgery is begun. Of these the mechanical preparation is probably of greater value. While normally we like to use a saline purge at the outset of preparation this must be omitted in the presence of complete obstruction. Where obstruction is not absolute I like to give a dram of Fleet's Phospho-soda each hour until the desired result is obtained. Once feces and gas start to pass, daily enemas help promote decompression.

For antibiotic preparation of the bowel contents sulfasuxidine is given in doses of 1 gm. every six hours. Forty-eight hours before surgery neomycin, 1 gm. every six hours, is added. Of course, where obstruction is complete no oral medication is given. In cases where intestinal function is reestablished oral intake is limited to fluids until the obstruction is relieved surgically. Forty-eight hours suffices for adequate preparation, rather than the 4-5 day period formerly used.

Causes of Colonic Obstruction and Their Treatment

Welch has enumerated over 30 major causes of colonic obstruction. Of these only a few of the more important will be discussed.

Congenital Abnormalities

Of the congenital abnormalities the most important are the malformations of the anus and rectum. Ladd and Gross mention four types. Type 1—The rectum and anus are patent but stenosis is present 1-4 cm. above the anus. Such cases may respond to repeated dilatation. Type 2—A thin membrane covers the anal opening. Excision of this membrane and suture of mucous membrane to the skin is recommended. In Type 3 the anus is imperforate and a blind pouch of rectum is noted by x-ray films made in the inverted position. Posteroanterior and lateral views are taken to determine the lower level of the blind loop. If within 1.5 cm. of the skin, satisfactory repair will be obtained by a perineal dissection. If above this level a combined abdominoperineal approach is safer. In Type 4 the lower rectal structures are all normal but end blindly. Usually about 4 cm. above this is found the blind pouch of the upper rectum. Surgical correction requires a combined abdominoperineal approach. Since many of these infants with congenital defects are in poor condition it is wiser in such cases to perform a preliminary transverse colostomy and defer definitive surgery for a year or two.

Inflammatory Lesions

Diverticulitis is the most frequent cause of inflammatory obstruction of the colon and by far the most common areas to become obstructed are the sigmoid and rectosigmoid. While the obstruction is usually not as acute as that due to carcinoma the clinical differentiation may be quite difficult. When the obstruction is complicated by localized abscess, dissection must be done carefully to avoid spillage of abscess contents. Such inflammatory lesions may also involve small bowel obstruction by adhesion to the inflammatory area. In such cases we have found it best to separate the adhesions and to treat the diverticulitis by staged resection with subsequent closure of the double-barrelled colostomy. When the small intestine is not involved we have found primary resection with immediate end-to-end anastomosis to be safe. Antibiotic drugs are given intravenously for 72 hours postoperatively.

Ulcerative colitis rarely produces intestinal obstruction unless there is a complicating carcinoma. Since most patients with chronic ulcerative colitis have been aware of their disease for a long time, when obstructive symptoms appear the patient must be prepared for an extensive colectomy to remove the diseased bowel.

Volvulus

Volvulus affects all portions of the gastrointestinal tract but the left colon most commonly suffers. Conservative measures such as insertion of long colon

tubes, sigmoidoscopes or the administration of barium by enema may relieve the volvulus but recurrence is not uncommon. I have seen operative detorsion and plication of the lengthy mesentery also followed by recurrence. Therefore, I believe definitive resection of redundant bowel to be the treatment of choice, especially in patients who develop recurrence after a trial of more conservative measures.

Tumors

Tumor is the commonest cause of colonic obstruction and of these 90 per cent are carcinoma (Berry). Most frequently the area of involvement is the left colon. It is remarkable that in so many patients with carcinoma of the colon the first dramatic symptoms are those of obstruction. Usually the patient will have noted increasing obstipation but occasionally even this reliable sign fails. Bleeding is often absent or unrecognized particularly in the sclerosing or "napkin-ring" type of tumor. Treatment requires prompt but not necessarily immediate operation. Marked distention of the cecum on x-ray examination is an ominous sign and we have seen the cecum perforate with fatal consequences when temporizing measures were tried. The use of long tubes in the preparation of the patient for emergency or elective surgery of the large intestine is mentioned only to be condemned. I believe the only indication for the use of the long tube in colonic surgery is in the rare instance when inflammatory adhesions produce small bowel obstruction in the pre- or postoperative period. In my experience the long intestinal tube does nothing to prevent such an occurrence and, in fact, appears to increase its frequency. Add to this the discomfort to the patient, the increased hazard of pulmonary complications in the aged and the loss of valuable electrolytes—one need give no additional reasons, though there are others.

I prefer one-stage resections, *when feasible,* for obstructions of the colon. This is most often possible in lesions of the cecum, ascending and transverse colons. In such cases, chronic obstruction will be found to have produced dilatation of the terminal ileum so that resection and one-stage ileotransversostomy can be readily accomplished by end-to-end anastomosis. To facilitate the operation a 16-18 gauge needle attached to the suction apparatus will remove trapped gas. Several punctures may be necessary. No suturing is required when the needle is withdrawn. In obstruction of the left colon one-stage resection and anastomosis is not as often possible. Until recently it was almost never done. Patients with obstruction cannot be prepared for surgery by enemas, purges and intestinal antibiotics. The colon is distended by gas and semisolid feces. The intestinal wall of the proximal bowel is thin, hypoxic and anemic. Every suture hole is a potential source of leakage. Such patients are best treated by preliminary transverse colostomy or cecostomy and subsequent resection or by obstructive resection. A catheter placed in the exteriorized proximal loop immediately after the wound is closed, relieves gaseous distention and the danger of cecal blow-out.

In borderline cases, where an immediate anastomosis has been done and some concern is felt about the security of the suture line I prefer catheter appendicostomy or catheter cecostomy. Such a tube serves a double purpose. It immediately acts as a safety valve for the escape of gas and liquid feces. Secondly, it may be used as soon as the day after operation to permit instillation of intestinal antibiotics directly into the colon. I am certain that by this method we have been able to remove successfully by one-stage resection and anastomosis obstructing tumors that formerly would have required multiple-staged procedures.

Conclusions

1. Obstruction of the large bowel is still a serious disease which requires care and individualization to insure recovery.

2. Colicky pain, obstipation alternating with diarrhea, elevation of the pulse rate, abdominal distention and characteristic x-ray findings are important in establishing the diagnosis. The digital examination of the rectum and sigmoidoscopic examination are valuable aids in diagnosis.

3. Patients are prepared for surgery whenever possible by enema, saline, catheter, antibiotic drugs and liquid diet. When obstruction is complete cecostomy or transverse colostomy are performed as soon as fluid and electrolyte balance are restored.

4. The major causes of large bowel obstruction are congenital anomalies, inflammatory lesions, volvulus and malignant tumors.

5. Methods of treatment of these most common conditions have been discussed.

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Discussion

Question: Have you ever seen volvulus cause obstruction without pain?

Dr. Albert Behrend (Philadelphia, Pa.):—I don't remember any cases of volvulus that have not been associated with crampy abdominal pain, but I suppose that it is possible if the volvulus is not complete and the obstruction is not complete, the pain would be minimal in certain instances.

Dr. Helen Van Fossen (New Orleans, La.):—How often does polycythemia cause mesentery thrombosis?

Dr. Behrend:—Well, we always suspect it whenever a case of polycythemia comes along that has abdominal pain. I'm still looking for the first one that I can prove. I haven't seen it.

ABSTRACTS FOR GASTROENTEROLOGISTS

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ESOPHAGUS

ESOPHAGEAL HIATUS HERNIA: CONSIDERATIONS IN THE SELECTION OF PATIENTS FOR OPERATIVE CORRECTION: James H. Growdon and James T. Parsons. Missouri Med. 56:1237 (Nov.), 1959.

Discussion of esophageal hiatus hernia, and patients that are candidates for this operative procedure, are well presented in this paper. Due to increased knowledge of the anatomic and physiologic derangements associated with this disease surgical technics and procedures have improved considerably.

Methods of diagnosis and use of x-ray studies are gone into in great detail. It is recommended that the patient be studied in the hospital and checked in various postural positions. Most important symptom in hiatal hernia is that the condition is aggravated by posture. Pneumoperitoneum has been suggested as an additional aid in diagnosis. Fifty-one cases are presented and the operative treatment is described.

This is a common disorder, occurs in all age groups and is especially prone to occur in women over 50 years of age.

ABRAHAM BERNSTEIN

STOMACH

RESULTS OF SURGICAL TREATMENT OF CANCER OF THE STOMACH: N. N. Trapeznikov. Brit. M. J. 5156:857 (31 Oct.), 1959.

The author states that in the Soviet Union the treatment of cancer of the stomach is one of the most vital problems of oncology. A series of 722 cases of cancer of the stomach are reported during the period of 1952-1958. Four hundred fifty-one cases had radical surgery, total gastrectomy with resection of glands with a mortality rate after surgery of 12.6 per cent. Two hundred fifty-four cases had palliative anastomosis with resection of tumor and a mortality rate of 21 per cent, 3 to 5 years after surgery. The type of surgery and methods used are described graphically.

A program of chemotherapy in conjunction with surgery is advocated. The drugs used, dosage and administration is gone into in great detail.

ABRAHAM BERNSTEIN

ADULT HYPERTROPHIC PYLORIC STENOSIS: Harry C. Mack. A.M.A. Arch. Int. Med. 104:574 (Oct.), 1959.

Two cases of this disorder in adults are reported. They were verified by microscopic examination of the surgically excised lesion. A greatly hypertrophic musculature was found below a normal gastric mucosa. Clinically this condition may be asymptomatic or may cause anorexia, fullness, nausea, vomiting, pain after eating and weight loss. X-ray abnormalities permitted distinguishing between a diffuse form causing a long string-like pyloric narrowing and a focal form appearing as prepyloric indentation, filling defect or niche-like projection. The etiology of adult hypertrophic pyloric stenosis is uncertain, it may be congenital or acquired. The treatment is surgical.

H. B. Eisenstadt

GASTRIC CARCINOID TUMOR: Richard Schoenfeld, Jules Cahan and Robert Dyer. A.M.A. Arch. Int. Med. 104:649 (Oct.), 1959.

A case of this rare lesion occurred in a 40-year old female suffering from gas, epigastric burning, nausea, hematemesis and melena. Repeated x-ray examinations of the stomach were negative, however, a round ulcer at the lesser curvature of the antrum was seen repeatedly by gastroscopy. Surgical exploration revealed no abnormality before gastrotomy. Then a small ulcerated elevated area was discovered inside of the stomach. There was no elevation of 5HIAA and no "carcinoid syndrome" which have occurred with some cases of gastric carcinoid. Usually the symptoms of this rare lesion resemble ulcer, however, they do not respond to ulcer treatment with antacid, antispasmodics and diet.

H. B. Eisenstadt

LEIOMYOSARCOMA OF THE STOMACH, A REVIEW OF TEN CASES: Peter M. Masley. Am. J. Digest. Dis. 4:792-811 (Oct.), 1959.

The literature is reviewed and 10 new cases are presented. Two cases were microscopically benign leiomyomas that eventually metastasized. One case involved a gastric adenocarcinoma. A case with gastric fistula leading to the center of a large necrotic exogastric leiomyosarcoma is presented. It is suggested that leiomyosarcoma be considered in those cases where a gastric tumor, a gastric fistula, extragastric barium shadows are found in patients with a long history of vague epigastric complaints showing anemia secondary to blood loss.

Walter Cane

RESTORATION OF GASTRODUODENAL CONTINUITY: J. H. Sewak and H. J. Movius, II. J.A.M.A. 171:1804 (28 Nov.), 1959.

The possibility and effectiveness of secondary operative procedures and to restore gastrointestinal continuity was studied in 30 patients who had suffered disabling complications after various operative procedures for the correction of benign gastric and duodenal ulcers. The largest group consisted of 13 patients in whom the original operation was vagotomy and gastrojejunostomy. All of the 30 patients had symptoms so severe as to prevent them from carrying on gainful occupations, and in each case medical treatment had been given a thorough trial. The corrective operation consisted of closing the gastrojejunal stoma and frequently included end-to-end anastomosis for repair of the jejunum and end-to-end anastomosis between stomach and duodenum. Only one patient failed to obtain relief by the corrective operation; eight others were but partially relieved and required continued medical or dietary treatment. Twenty-one became free of symptoms, were relieved of the need for medication, and were able to return to work.

Glenn S. Rost

THE SURGICAL TREATMENT OF PEPTIC ULCER: EVOLUTIONARY PROGRESS: Claude J. Hunt. J. Internat. Coll. Surgeons 32:491 (5 Nov.), 1959.

The evolution of treatment for peptic ulcer is discussed. Either perforation or recurrent obstruction requires surgical intervention.

With regard to perforation, the author notes the controversy between closure and resection and feels the decision is relative to whether the lesion is gastric or duodenal, obstructive or associated with previous hemorrhage.

Vagotomy routinely accompanying gastrectomy is also discussed, with emphasis on its special value in cases of inflammatory duodenal ulcer and in the presence of a poor nutritional state, excessive nocturnal secretion and a high acid level.

For gastrojejunal ulcer associated with gastroenterostomy and gastric resection, the author recommends resection for the former and vagotomy for the latter. Replacement of a portion of the stomach with transplant from the colon or the small intestine has both merits and drawbacks. It is not advisable in the treatment of duodenal ulcer.

GLENN S. ROST

THE PROBLEM OF GASTRIC ULCER: Joseph B. Kirsner. A.M.A. Arch. Int. Med. 104:995 (Dec.), 1959.

Errors of diagnosis occur much more often in considering a benign lesion to be malignant than in the reverse. Mistakes decrease with the experience and the care of the examiner, the number of re-examinations and the use of all diagnostic measures available including gastric analysis, gastric cytology, occult blood in stool and gastroscopy. In a large survey the diagnoses made by experienced gastroenterologists were twice as accurate as those of general surgeons. Persisting negative stools suggest a benign ulcer while positive occult blood over a long period of time in spite of dieting is suspicious of malignancy. Absence or low output of hydrochloric acid suggest cancer. Urinary pepsinogen below 1,000 units favors malignancy, above 3,000 units benign ulceration. With vigorous repeated lavage positive as well as negative cytology is highly significant. The therapeutic test indicating complete healing within six weeks is the most decisive method of diagnosis. However, this test is only useful if performed in the hospital under experienced supervision. Conceding the theoretical possibility of malignant transformation of a benign ulcer the incidence of such change must be extremely low, perhaps 1 to 2 per cent. There is insufficient evidence at present to determine whether or not resection of all gastric ulcers will increase significantly the survival of gastric cancer.

H. B. EISENSTADT

EXFOLIATIVE CYTOLOGY AS AN AID TO THE DIAGNOSIS OF GASTRIC CARCINOMA: Edward J. Kurt, Charles H. Brown, Lawrence J. McCormack, John B. Hazard and Doris Belovich. Cleveland Clin. Quart. 25:133 (July), 1958.

The authors studied exfoliative gastric cytology in 116 patients.

The technic utilized consisted of preliminary washing of the stomach with water through a Levin tube and then the introduction and aspiration of an acetate-buffered solution into chilled flasks. Using this technic the results in 37 pathologic diagnoses were 92.9 per cent accurate in malignant lesions and 91 per cent in those which were benign. There were two false positives and one false negative reports.

The indications for exfoliative gastric cytology are: 1. Diagnosis in suspected cases of malignant change. 2. Screening. 3. Research. 4. Follow-up evaluation of cellular changes following irradiation for non-neoplastic conditions. 5. Confirmation of the gastric origin of a neoplasm evident as a metastatic tumor. 6. Supportive evidence of a gastric ulcer which is on trial of medical therapy.

THEODORE COHEN

ETIOLOGY OF DUODENAL ULCER: II. SERUM PEPSINOGEN AND PEPTIC ULCER IN INDUCTEES: Paul G. Yessler, Morton F. Reiser and David McK. Rioch. J.A.M.A. 169:451 (31 Jan.), 1959.

This is a study of the relationship between serum pepsinogen and peptic ulcer in 2,262 randomly selected army inductees. The average serum pepsinogen value was 440 with a standard deviation of 136. Hyposecretion was defined as a pepsinogen value below 304 and hypersecretion a value greater than 576. A diagnosis of peptic ulcer with positive x-ray evidence was made in 16 cases. Serum pepsinogen values in the ulcer group varied from 427 to 1,027 units. The mean of the pepsinogen values for the ulcer group was 707 units.

An increased frequency in the incidence of blood group O in patients with peptic ulcer has been reported. In this series no relationship between blood type and either peptic ulcer or serum pepsinogen was demonstrated. These findings are consistent with others and show a significant relationship between serum pepsinogen levels and peptic ulcer. Pepsinogen levels failed to correlate with over all military performance or other objective measurements of social behavior.

ARNOLD STANTON

RADIATION THERAPY FOR STOMA ULCER OCCURRING AFTER SUBTOTAL GASTRECTOMY: Everett D. Kiefer and Magnus I. Smedal. J.A.M.A. 169:447 (31 Jan.), 1959.

Anastomotic ulcers developed in 6.6 per cent of duodenal ulcer patients who had a Billroth II gastrectomy. This is a study of the effect of radiation therapy on 23 such patients with stoma ulcers after subtotal gastrectomy. In 18 of the 23 patients an ulcer crater on the jejunal side of the anastomosis was demonstrated by x-ray, and five had bleeding from the gastrojejunal area. Free hydrochloric acid was found in the gastric secretions before treatment, but after irradiation with 1,800 r the acidity began to diminish in two to four weeks and remained low for about two years. In the 23 irradiated patients, clinically satisfactory results were obtained in 15 after one course of therapy, and in three others after further irradiation. There were three failures with recurrent stoma ulceration. Adequate radiation therapy consistently reduces the hydrochloric acid, and if achlorhydria is established, relief of pain and healing of the anastomotic ulcer occur.

In such patients with anastomotic ulcer or gastric hemorrhage associated with the secretion of hydrochloric acid, irradiation of the gastric stump is a safe and effective treatment which may obviate the need for additional major surgery.

ARNOLD STANTON

HIATAL HERNIA, ROENTGEN INCIDENCE AND DIAGNOSIS: George N. Stein, Arthur Finkelstein. Am. J. Digest. Dis. 5:77-87 (Feb.), 1960.

In 100 consecutive radiographic studies of the upper gastrointestinal tract in adults varying in age from 20 to 85 years, hiatal hernias were diagnosed in 50 per cent. Although the rate of occurrence was higher over the age of 40, 34.7 per cent of patients under that age were found to have hernias. The high incidence is attributable in part to the technic of the examination and in part to the authors' rather broad definition of the term "hiatal hernia". The writers consider hiatal hernias as clinically significant only insofar as they can be related to the patient's symptoms.

WALTER CANE

SURGERY—GASTRIC ANTRUM: Berald W. Peskin and J. D. Thompson. Am. J. M. Sc. 239:231-251 (Feb.), 1960.

This comprehensive review of the gastric antrum includes a definition of terms, the anatomy and physiology involved, the consideration of surgery of the antrum, the presentation of the effects of various drugs on the antrum, and a consideration of the

difficulties in forming conclusions in the experimental work involved.

The authors consider the antrum the least understood area of the stomach, and feel it holds the key to surgical approach to ulcer.

BERNARD FARFEL

CARCINOMA OF THE STOMACH: W. F. Mitty, Jr., L. M. Rousselot, W. J. Grace. Am. J. Digest. Dis. 5:249-258 (March), 1960

The authors review their clinical experience with cancer of the stomach as seen on the surgical service of St. Vincent's Hospital in New York City, between the years 1947 through 1955. Of 169 patients seen, 50 (32.2 per cent) were candidates for a curative resection when first seen. Five-year survival rate following total gastrectomies was 5.5 per cent while the curative subtotal gastrectomy survival rate was 34.4 per cent. In patients with negative nodes undergoing curative subtotal gastrectomy, the five-year survival rate was 38 per cent. Of the 169 patients seen, primary treatment was rendered 155 patients with a total five-year survival rate of the treated of 7.7 per cent.

WALTER CANE

EARLY INVESTIGATIONS OF HEMATEMESIS: G. N. Chandler, A. D. Cameron, A. H. Nunn and D. F. Street. Gut 1:1 (March), 1960.

This paper by these British investigators deals with early diagnosis of hematemesis during the first 24 hours. The authors used gastric aspiration, gastroscopy and barium meal examinations at the bedside all within 24 hours. This triad of examinations was caried out on 102 patients. Their accuracy was 80 per cent.

A high nocturnal acidity was found usual in bleeding from chronic ulcers. Of interest and perhaps unusual was their method of barium meal examination in the ward. Four ounces of barium suspension was drunk rapidly; the patient was turned in the right lateral position and films taken in the right anterior oblique, right posterior oblique and anteroposterior projections.

A short history of preceding dyspepsia was common in acute ulcers, and here medical treatment was found best. When early diagnostic procedures indicate the presence of a chronic peptic ulcer and if bleeding occurred after admission, especially if the patient was over 45, surgery was done immediately. Chronic gastric ulcers in particular, were amenable to surgery. In the majority of the patients barium meal in the ward was accepted as an alternative to later radiological investigation. In these cases there was no evidence to prove that recovery after hematemesis is hastened by confinement to bed. Patients were allowed up. This was a saving in time and a saving in bed occupancy. In all, the authors were enthusiastic about their triad of investigation in the first 24 hours after admission with hematemesis. The investigations were gastric aspiration, followed by gastroscopy, followed by barium meal in the ward all within the first 24 hours.

LIONEL MARKS

PEPTIC ULCER AND HYPERPARATHYROIDISM: Boy Frame, William S. Haubrich. A.M.A. Arch. Int. Med. 105:536 (April), 1960.

It is well known that hyperparathyroidism is associated with an increased tendency to peptic ulcer. Therefore, the serum calcium and phosphorus and the renal tubular reabsorption of phosphorus was determined in 300 ulcer patients. All anacids had to be withdrawn before the test for 72 hours because they influence the serum level and the urinary excretion of phosphorus. From this group 4 cases of hyperparathyroidism were identified (1.3 per cent). In each of these patients a single parathyroid adenoma was found and resected. The best screening test was found to be the serum calcium determination. This test should be made in all ulcer patients having a history of urinary calculus, polyuria, skeletal pain, pathological fractures, neuromuscular asthenia, anorexia, nausea or vomiting in the absence of ulcer complications, worsening of subjective distress while on conventional ulcer therapy,

particularly intolerance to milk, intractability or recurrence in spite of good medical or surgical therapy. Hypophosphatemia is not a suitable screening test because nonabsorbable aluminum gels will depress phosphate absorption. Renal tubular reabsorption was also not a useful test because of lack of specificity.

H. B. EISENSTADT

THE PHYSIOLOGIC BACKGROUND OF HEARTBURN, ESOPHAGITIS AND CARDIOSPASM: Franz J. Ingelfinger. Arch. Int. Med. 105:770 (May), 1960.

Careful modern investigations with intraluminal manometry have established a fact that a high pressure of 40 to 80 mm. of mercury develops in the posterior pharynx during swallowing; that the cricopharyngeus muscle is a powerful sphincter which undergoes inhibition during the swallowing act. These findings explain the dysphagia associated with neuromuscular disorders. There is no obstruction present in the upper esophagus, but a lack of muscular force to swallow the bolus down. The characteristic function of the body of the esophagus was believed to consist of a primary voluntary act of swallowing and a secondary reflex peristalsis initiated by the distention of the esophagus. However, both the primary and secondary types of esophageal peristalsis cannot be separated with modern methods. The question of reverse peristalsis of the esophagus remains unanswered. A proof of antiperistalsis has not been obtained. The question of where is the gastroesophageal junction remains also unanswered. The line where the squamous esophageal and glandular gastric mucosas meet is the anatomic junction in many cases, but not in all persons as gastric mucosa can line a large portion of the esophagus. The esophageal ring has been proven to be a hypertrophied gastroesophageal junction. It may be the cause of dysphagia particularly in connection with swallowing solid foods. The presence of an esophageal ring above a diaphragm is a proof of a hiatus hernia as this section belongs in the diaphragmatic opening. There is no anatomical sphincter at the lower end of the esophagus. There is, however, a physiologic sphincter at the place where the negative inspiratory pressure of the thorax suddenly becomes inverted to the positive inspiratory pressure of the peritoneal cavity. This sphincter, however, is not strong and plays no roll in regard to reflux of the stomach contents. The latter might be associated with weakening of the diaphragmatic pinchcock, however, this assumption remains to be proven. The diagnosis of a small hiatus hernia as well as the differentiation between a vestibule and a hiatus hernia will vary with the observer and cannot be finally decided in a great number of cases. One must depend more on clinical symptoms to make this diagnosis than roentgenological findings.

H. B. EISENSTADT

DUPLICATIONS OF THE STOMACH: Samuel Nissan. Am. J. Surg. 100:59 (July), 1960.

True duplications of the stomach are rare. They have been called accessory stomachs, enteric cysts, and enterogenous cysts. Duplications of the stomach are hollow, and they have a muscular coat usually consisting of two layers, a lining of gastric epithelium and an intimate attachment to the stomach.

Four patients with gastric duplications were treated in the Barnes and St. Louis Children's Hospitals between 1951 and 1958. Intrathoracic cysts were not included in this review.

The symptoms common to most patients with gastric duplications are: vomiting; intolerance to feeding; failure to gain weight; intermittent abdominal pain; and (infrequently) melena and hematemesis.

Excision of the duplications, together with the part of the stomach wall to which it adheres, is the simplest treatment for all except very large or multiple duplications. Very large duplications may be treated by excising the septum between the duplication and the stomach, converting the separate cavities into one.

Four cases are described, including operations.

CARL J. DEPRIZIO

INTESTINES

ELECTIVE SURGERY FOR DUODENAL ULCER—A GRADED APPROACH: EDITORIAL: Stanley O. Hoerr. Am. J. Surg. 99:4 (Jan.), 1960.

There is no single perfect operation for chronic duodenal ulcer. As of today, there are three groups: 1. subtotal gastric resection; 2. vagotomy with drainage, such as gastroenterostomy or pyloroplasty; and 3. vagotomy with a small gastric resection (removal of 50 per cent or less of the stomach). Any of these operations may be followed by the catastrophe of death. The results of a recent survey conducted by the Ohio Chapter of the American College of Surgeons, and published in the *American Journal of Surgery* in 1958 showed the death rate to be generally higher than anticipated.

It is the author's experience that at least 5 per cent of patients who have had vagotomy with gastroenterostomy will require a secondary gastric resection. However, if so, a second operation may be safer than the primary operation, since the ulcer is usually quiescent, and the inflammation in this area which increases the risk, has subsided or disappeared.

The other reason why surgeons have not adopted vagotomy with a drainage procedure is the inability of surgeons to master the technical details of a good subdiaphragmatic vagotomy.

In the meantime, surgeons should view with greater satisfaction the 80 to 85 per cent of benefited patients after vagotomy and gastroenterostomy and note the relative absence of fatalities and postoperative nutritional woes. The surgeon should also perfect his technic of subdiaphragmatic vagotomy, and learn that it is always easy to take some stomach out, but one cannot put it back in, and should view with equanimity the secondary gastric resection that occasionally is needed.

CARL J. DEPRIZIO

PRIMARY TUMORS OF THE SMALL INTESTINE: E. Meredith Alrich, Richard H. Blank and John J. Fomon. Am. J. Surg. 99:33 (Jan.), 1960.

When one realizes that the small bowel comprises approximately 75 per cent of the length and perhaps over 90 per cent of the internal surface of the alimentary canal, the incidence of neoplasms of the small intestine appear infrequently.

These tumors produce symptoms dependent upon both the type of tumor present and its location. The acute symptoms of complete intestinal obstruction are the result of intussusception of the bowel, the tumor being the cause of the intussusception. The symptoms of partial obstruction are caused by gradual compromise of the lumen of the bowel by encroachment of the tumor. The symptoms arising from local irritability secondary to tumor are atypical and difficult to evaluate.

The majority of tumors are overlooked in the course of routine examination but in recent years the roentgenologist has intensified his interest in this group of lesions, and there has been an increase in preoperative diagnosis.

Twenty-two cases of tumors of the small bowel treated at the University of Virginia Hospital over a 26-year period are reviewed, and a brief summary of the findings in these cases is presented.

CARL J. DEPRIZIO

INTUSSUSCEPTION OF THE VERMIFORM APPENDIX: Wilson Juca. Am. J. Surg. 99:106 (Jan.), 1960.

If one explores the surgical and pathological records of any hospital, very few cases of intussusception of the vermiform appendix will be found. In 50,000 specimens of the human vermiform appendix, Collins could identify only two cases of inverted appendix. The author wishes to report a new case of this rare condition.

A case report is given in which the intussuscepted appendix, starting the invagination into its nearest portion, and caught by the spasm of the muscular sphincter of the base, could not be reduced. The venous return was jeopardized and the intussus-

cepted appendix became swollen and edematous, making it difficult to reduce the intussusception.

Preoperative diagnosis of this rare disorder is very difficult, because it is generally confused clinically with inflammation of the appendix, or radiologically, with a tumor of the cecum.

CARL J. DEPRIZIO

HYPOCHOLESTEREMIA IN IDIOPATHIC STEATORRHEA: Isaac S. Friedman, Harold Cohn, Michael Zymaris and Martin Goldner. A.M.A. Arch. Int. Med. 105:112 (Jan.), 1960.

Hypocholesteremia and lipopenia may occur in cases of sprue and steatorrhea. A 36-year old white male had suffered from steatorrhea in childhood and from sprue during his adult life. He was observed for a period of 20 years. During this time his total cholesterol never exceeded 45 mg. per cent and his fasting total lipids 125 mg. per cent. His weight remained constant at 84 pounds. During adolescence this patient developed various neurological abnormalities such as tremor of the tongue, disturbance of speech, flaccid paraplegia and other changes attributed to his abnormal lipid metabolism. Gastric acidity and liver function tests were normal. Protein and carbohydrate digestion and absorption was normal while that of fat was markedly impaired. During a fat restricted diet the steatorrhea was mild but after a large fat meal both nonsplit and split fats increased greatly in the stool. This indicated a deficiency of both fat splitting and fat transporting enzymes. This patient demonstrated that sprue and steatorrhea may not only lead to an excessive amount of split fat in the stool but also of triglycerides and that the presence of the latter in the stool cannot be used as an absolute criterion in the differentiation of idiopathic and pancreatic steatorrhea.

H. B. EISENSTADT

MUCOCELE OF THE APPENDIX: Richard H. Marshak and Arnold Gerson. Am. J. Digest. Dis. 5:49-54 (Jan.), 1960.

A highly instructive case presentation of proven mucocele of the appendix together with masterful x-ray reproductions illustrating this rarely demonstrated condition is with the authors' thoroughness accompannied by differential diagnostic remarks. Mucocele may be suspected on the base of the following findings: 1. sharply outlined globular smooth filling defect; 2. at times marginal calcification; 3. nonfilling appendix; 4. varying degrees of invagination into the cecum; 5. possible evidence of extrinsic pressure along the adjacent lateral border of the terminal ileum.

WALTER CANE

SARCOMAS OF THE SMALL INTESTINE: REPORT OF THREE PATHOLOGIC TYPES WITH REVIEW OF THE LITERATURE: Yousif D. Al-Naaman. Am. J. Surg. 99:320 (March), 1960.

Sarcomas of the small intestines are not uncommon, although the reported cases in the literature do not exceed 600. In general, sarcomas are more common in the small intestine than in the large intestine.

Three pathologic types of sarcomas are presented and discussed: leiomyogenic, neurogenic and lymphogenic. The diagnosis of sarcomas of the small bowel is always difficult and is made late. The different types of manifestations are classified as follows: 1. cases discovered at autopsy; 2. cases in which clinical features include such obvious manifestations as distention of the abdomen; 3. cases in which the first symptoms are intussusception or perforation; 4. cases resembling peritonitis; 5. cases in which jaundice is the first symptom; 6. cases resembling ovarian cyst; and 7. cases resembling appendicitis.

Leiomyosarcoma occurs most commonly in the duodenum and the jejunum and constitutes about 20 per cent of all sarcomas of the small bowel. A great majority of neurogenic sarcomas have been considered as fibrosarcomas and vice versa. The microscopic appearance is generally that of fibrosarcoma. Lymphosarcomas have been found

in the ileum and other parts of the small intestines at about the ileocecal junction.

A complete follow-up report of three patients is presented. Data are presented as to the origin, frequency, percentage and character of these tumors, their clinical features and diagnosis. The symptomatology and complications of this condition are outlined. The treatment of choice is surgical resection. The presence of metastasis is no contraindication for surgery. The prognosis usually follows the pathologic picture.

CARL J. DEPRIZIO

PERFORATIONS OF THE DISTAL LARGE INTESTINES PRODUCED BY INTRALUMINAL TRAUMAS. Wesley Furste and Harvey Knoernschild. Am. J. Surg. 99:665 (May), 1960.

Only one injury, in this series of 13 cases, was self-induced and only one produced by a layman. The remaining 11 cases occurred in hospitals at the time of enemas or during sigmoidoscopic examinations, with or without biopsy.

Perforation of the intraluminal distal large intestine may be caused by any one of a number of things: externally, by impalement, insertion of an air hose outlet, diagnostic and therapeutic procedures, abnormal practice of insertion of articles into the anal canal; and internally, by weakness of the tissues due to chronic disease, carcinoma, diverticulitis of the large intestine, or Hirschsprung's disease.

The symptoms and signs vary considerably with different patients, with the size of the intestinal perforation and with its intraperitoneal or extraperitoneal position. In cases of intraperitoneal rupture, the symptoms and signs follow closely the extent of the peritonitis.

Immediate laparotomy is indicated, and essential to immediate diagnosis. The choice of treatment may be difficult: primary closure may be performed or some type of colostomy, if elected. Primary closure may be justified, when the lesion is detected within several hours of occurrence, the perforation small, the injured area has a good blood supply, and the bowel appears to be viable.

If the mortality rates are to be reduced, supportive measures must be meticulously carried out, including blood and fluid needs. In several large series, the rate varied from 12 to 68 per cent, with the majority of the figures being closer to the high rate. The rate was 31 per cent, among the 13 patients discussed in this article.

CARL J. DEPRIZIO

SMALL BOWEL OBSTRUCTION DUE TO HEMORRHAGE SECONDARY TO ANTICOAGULANT THERAPY: Allan E. Gilbert and Norman C. Jorgenson. Am. J. Surg. 99:945 (June), 1960.

The writers present a case report of a 77-year old white man, admitted to the hospital with the chief complaint of nonradiating, cramping abdominal pain of 18 hours' duration. The past history revealed arteriosclerotic heart disease for which he had been receiving maintenance doses of Coumadin sodium, which produced a prothrombin time within therapeutic range. Examination revealed a flat abdomen, with a suggestion of a tender mass in the left upper quadrant. Laboratory and x-ray studies presented clinical and radiographic evidence of small bowel obstruction, in addition to a marked defect in blood coagulation. The patient was treated by conservative measures, and 18 hours after admission underwent surgery. Examination showed hemorrhagic infarct of the ileum and adjacent mesentery. Segmental resection was performed and end-to-end anastomosis accomplished.

Postoperatively, the patient's initial course was uneventful and long tube decompression was discontinued on the 4th day. On the 5th day, sanguineous drainage appeared from the wound, following a coughing episode, and examination showed the wound dehiscence in which the stainless steel sutures had cut through the medial side of the abdominal closure. The patient again underwent surgery during which secondary closure of the wound was accomplished by the use of interrupted

sutures. The remainder of the hospital course was without incidence and the patient was discharged on the 10th postoperative day.

VASCULAR RESPONSES IN THE EXPOSED HUMAN COLON: Jack D. Welsh, and Stewart Wolf. Am. J. Digest. Dis. 5:579-602 (July), 1960.

The paper adds to the list of recorded observations for which one of the authors has long become famous. The individual studied here had a transverse colostomy for ulcerative colitis. The exposed portions were subjected to different technics of observation and measurement, namely, direct study of the mucosa through a dissecting microscope and determinations of mucosal temperature with a radiometer. The response of the colonic mucosa to alimentary, pharmacological, and emotional stimuli were recorded and interpreted with a maximum of thoroughness and a minimum of theorizing.

WALTER CANE

LIVER AND BILIARY TRACT

NEWER CONCEPTS OF CIRRHOSIS: Gerald Klatskin. A.M.A. Arch. Int. Med. 104:899 (Dec.), 1959.

Alcohol plays an important role in the etiology of hepatic cirrhosis. This disease occurs six times as often in drinkers than in nondrinkers. The death rate of cirrhosis is closely correlated with the per capita consumption of alcohol. Most authorities believe that faulty dietary habits associated with chronic alcoholism are the cause of this liver disease. However, occasionally alcoholics develop cirrhosis in spite of adequate dietary intake. Furthermore, some of the histological changes of alcoholic cirrhosis are not seen in nutritional cirrhosis. Also the mere withdrawal of alcohol without change of diet produces a significant improvement of functional and pathological alterations of the organ. Alcohol increases choline requirement, depresses hepatic enzyme activity and increases susceptibility to infections particularly to hepatitis.

H. B. EISENSTADT

RADIOGRAPHY IN THE DIAGNOSIS OF HEPATIC DISEASE: John R. Hodgson. A.M.A. Arch. Int. Med. 104:893 (Dec.), 1959.

An ordinary scout film of the abdomen may be useful in the diagnosis of hepatic diseases showing enlargement, deformity and calcification of the liver. The latter may be due to hydatid disease, hemangioma, tuberculosis and primary and metastatic tumor. Noncalcified localized lesions of the liver cannot be demonstrated with x-ray methods. A simple nontoxic substance, which is radioopaque, can be taken up by the liver and which will break down in time without toxicity is badly needed to demonstrate such changes. Thorotrast will show a localized disease well but is too toxic for human use. Injection of opaque substances through the hepatic veins after catheterization, aortography and splenic portography are specialized methods useful in a limited number of cases but technically too complicated for common use.

H. B. EISENSTADT

METASTATIC CARCINOMA IN THE CIRRHOTIC LIVER: Bernhard Chomet, Jonas Valaitis and George Pearah. Am. J. M. Sc. 238:753-759 (Dec.), 1959.

The authors point out the rarity of hepatic metastasis in the cirrhotic patient. Twenty-five cases have been recorded in the literature, and three more are added in this report. No adequate explanation for this phenomenon is given but the various theories are considered.

BERNARD FARFEL

PATHOGENIC ROLE OF DUODENAL DYSKINESIAS AND DUODENOBILIARY REGURGITATION IN CHRONIC DISORDERS OF THE GALLBLADDER, THE MAIN BILIARY DUCTS AND THE INTRAHEPATIC BILIARY DUCTS: Guy Albot and M. Kapandji. Semaine des Hopitaux de Paris 5:194-210 (18 Jan.), 1960.

The authors have already shown elsewhere that duodenal dyskinesias with spasms of the sphincters of the duodenal ring can cause pockets of stocking whose contractions induce a duodenobiliary regurgitation.

In the present article they recall the part played by duodenal dyskinesias and duodenal regurgitation in hepatobiliary disorders.

It is obvious when it complicates the operation of bilioduodenal derivation and sphincterotomies; but it is more difficult to show its existence in primary hepatobiliary disorders. The authors prove this in nonlithiasic cholecystitis by regurgitation during certain cases of lithiasic cholecystitis (secondary or otherwise to gastrectomy), in hepatitis secondary to chronic cholecystitis. They also show their importance in the genesis of chronic angiocolitic affections of a serious nature of the main bile duct which can go from hepaticocholedocitis to intrahepatic cholangiolitis with an apparently primary biliary cirrhosis.

Seeing that it is by means of duodenobiliary regurgitation that duodenal dyskinesia can create lesions of the biliary ducts, the authors have based their study on present-day semiology of duodenobiliary regurgitation. This duodenobiliary regurgitation occurs in a relatively easy way when the choledoch, whether of the short or long variety, opens out without a long intramural course into the duodenal pockets adjacent to the duodenal sphincters (bulboduodenal, medioduodenal, Ochsner or tertioduodenal); it occurs with greater difficulty in medium size choledochs whose lengthy and oblique intramural course ends in the Busi-Kapandji medioduodenal sphincter zone. But in every case, three methods enable it to be found. It may be suspected after a dose of pancreatic ferments in the vesicular bile. It may be considered likely when a duodenopancreatic regurgitation occurs during biliary radiomanometry especially if it is at low pressure. The irrefutable proof is that of the radiomanometric syndrome of a mounting duodenal residuary.

The participation of these duodenobiliary regurgitations explains why bacteriological studies so far have been unable to give a sufficiently clear explanation of the genesis of these diseases.

AN ANALYSIS OF THE CLINICAL APPLICATION OF THE VAN DEN BERGH REACTION IN JAUNDICE: Jean A. Chapman, Thomas H. Johnson, Jr. and Michael M. Karl. Am. J. M. Sc. 239:11-16 (Jan.), 1960.

The authors present a re-evaluation of the serum van den Bergh reaction. An extensive review of past thinking regarding this test and its value in differentiating obstructive from medical jaundice is presented. A statistical study of 115 cases of diffuse hepatocellular disease, hemolytic anemia, extrahepatic obstruction of the common bile duct, and a group of miscellaneous cases are presented to determine the validity of the van den Bergh reaction. The conclusion is drawn that more marked elevation of the serum bilirubin is found with obstructive disease generally, but fractionation of serum bilirubin is not of any real significance.

BERNARD FARFEL

THE PROGNOSTIC SIGNIFICANCE OF SO-CALLED MALLORY BODIES IN PORTAL CIRRHOSIS: John D. Rice, Jr. and Raymond Yesner. A.M.A. Arch. Int. Med. 105:99 (Jan.), 1960.

F. B. Mallory called attention to the presence of certain hyaline particles in the liver cell cytoplasm of cirrhotics; they appear in form of round or lobulated masses. They have been named Mallory bodies or alcoholic hyaline. These deposits are not specific for hepatic disease associated with alcoholism but are most often seen during the active phase of liver disease, particularly hepatic cirrhosis. In order to evaluate

the importance of Mallory bodies the clinical records of 20 cases showing these intracytoplasmic inclusions were compared with the similar number of charts from patients not demonstrating this substance at liver biopsies. It was demonstrated that the presence of Mallory bodies not only indicated active liver disease but also a poor prognosis. Most of the patients showing this hyaline had a progressive course leading to hepatic failure and frequently to death.

H. B. EISENSTADT

TRAUMATIC RUPTURE OF THE GALLBLADDER WITHOUT A PENETRATING WOUND OF THE ABDOMINAL WALL: W. Clayton Davis and John D. German. Am. J. Surg. 99:103 (Jan.), 1960.

Because the condition of traumatic rupture of the gallbladder is so infrequent, and surgical intervention is necessary as soon as the diagnosis is suspected, a case report of a 7-year old white boy is given in detail.

Four hours previous to admission to the hospital, he had fallen and landed across his epigastrium and immediately complained of severe abdominal pain. He complained of extreme thirst and was perspiring profusely. There was generalized abdominal rigidity with no definite localization of tenderness. Peristalsis was absent. Rectal examination showed exquisite tenderness to palpation of the anterior rectal wall. There was one small superficial abrasion in the right periumbilical region. WBC was 35,200.

X-ray studies revealed some scattered gas in the small bowel but no evidence of dilatation or other abnormality. A rupture of a hollow viscus was suspected, and a Levin tube was placed in the stomach.

Under general anesthesia an exploratory laparotomy was performed. The only abnormality found was a laceration of the gallbladder on the right lateral surface, midway between the entrance of the cystic duct and the fundus. The laceration was closed and the abdominal cavity aspirated. Examination of the abdominal cavity and intestines was otherwise negative. A drain was placed through a stab wound in the right upper quadrant, and the abdomen closed.

CARL J. DEPRIZIO

EFFECTS OF GALLBLADDER LITHIASIS ON THE LIVER, HEPATITIS ACCOMPANYING GALLBLADDER LITHIASIS AND ITS PATHOGENESIS: Guy Albot and M. Kapandi. La Semaine des Hopitaux 8:469-486 (18 Feb.), 1960.

Prompted by 11 observations of gallbladder lithiasis studied clinically, the authors show the practical and theoretical importance of the hepatitis that accompanies lithiasic cholecystitis.

They describe two main varieties: mesenchymatous hepatitis without any biological functional repercussions on the liver and diffuse parenchymatous hepatitis with consistent biological functional repercussions.

As regards the pathogenesis of these lesions, the authors confirm that the gallbladder lesions precede those of the liver and show that the transmission mechanisms of the inflammation are varied: particularly hepatic lesions correspond to each one of these different mechanisms.

Certain peribiliary fibrous cuffs in the portal spaces may be the result of nonmicrobial enzymatic reflux phenomena occasioned by a duodenobiliary dyskinesia coexisting with the gallbladder lithiasis.

The inflammatory lesions of the portal spaces and of Glisson's capsule seem to be due above all to the propagation by the lymph vessels of an inflammation of the gallbladder which is superadded to the lithiasis. This propagation might also be made through the intermediary of certain accessory portal veins going from the gallbladder to the liver.

The intrahepatic portal phlebitis described here for the first time seems to be secondary either to a lymphangitis of vesicular origin in the portal spaces or to a phlebitis of the accessory portal veins. It always coincides with a diffuse parenchymatous hepatitis, which may or may not be icterogenic, and is always accompanied by functional perturbations of the flow tests and sometimes also by disorders of the flocculation tests. This portal phlebitis thus appears to be a complication of inflammatory phenomena of Glisson's capsule and of the

portal spaces which is propagated from the gallbladder and would seem to account for the diffuse parenchymatous hepatitis.

This would show the fundamental role of the gallbladder retention pocket in the diffusion of the inflammation: the inflamed gallbladder may also have repercussions on the duodenum and exaggerate its functional disorders. It can thus be said that the gallbladder lesions more often than not precede the other lesions. It is accordingly not surprising that cholecystectomy should more often than not lead to the disappearance of the hepatic lesions and bring about an improvement of the dyskinesia phenomena.

However, the functional disorders of the duodenum may precede the lesions of the gallbladder and even play a part in their appearance. In certain rare cases, the biological disorders or the hepatic lesions may be prolonged and maintained after cholecystectomy by the persistence of the duodenal dyskinesia and the duodeno-biliary reflux which accordingly need to be treated after the operation has been performed.

GUY ALBOT

DISAPPEARING GALLSTONES: A LESSON IN MANAGEMENT OF PATIENTS WITH GALLSTONES: Seymour Fiske Ochsner. Am. J. Surg. 99:336 (March), 1960.

A report is given of a patient who had gallstones that were conclusively visualized in roentgenograms and yet were not present when the gallbladder was removed. This serves to alert others concerning the experience.

The most plausible explanation for the disappearance of the gallstones in the case report given, would seem to be that the small stones passed through the cystic and common ducts into the duodenum and were eliminated. Another possible explanation is that they were composed of soft cholesterol collections which formed during a period of hypercholesterolemia in pregnancy and dissolved after pregnancy when the cholesterol metabolism became normal. Occurrence of temporary hypercholesterolemia in the late stages of pregnancy is widely recognized, although unfortunately there is no laboratory proof of its occurrence in this patient, because such tests were not performed.

It is therefore advisable that when small, radiolucent gallstones are discovered during pregnancy, or in the postpartum period, surgery should be deferred for several months, and immediately before operation, the cholecystographic findings should be verified by re-examination.

CARL J. DEPRIZIO

CHRONIC IDIOPATHIC JAUNDICE: Gerald S. Margulies and Donald H. Finger. Am. J. Surg. 99:339 (March), 1960.

A case of chronic idiopathic jaundice, a disease only recently recognized, is presented in detail. The disease is characterized clinically by chronic or intermittent jaundice, is usually found in young people, and has a tendency to run in families. Jaundice fluctuates from time to time, and tends to be aggravated or precipitated by intercurrent diseases, pregnancy, surgical operations, severe physical strain and alcoholism. There is frequently abdominal pain, fatigue, dark urine and slight hepatomegaly.

There is failure of the gallbladder to visualize on cholecystography due to inability of the liver cells to excrete the dye. Chronic idiopathic jaundice may readily be mistaken for obstructive jaundice. The main differential features are that in chronic idiopathic jaundice, serum alkaline phosphatase is usually normal or only slightly elevated, and there are positive findings on needle biopsy. Hepatitis can be excluded by liver function tests and needle biopsy of the liver. Hemolytic jaundice can be differentiated by suitable hematologic studies.

This clinicopathologic entity is not well known by the medical profession and the authors believe that further discussion and emphasis of it certainly is warranted in the differential diagnosis of jaundice. It is particularly important since diagnosis may be confirmed by biopsy of the liver with the Vim-Silverman needle, if the condition is considered, and thus unnecessary laparotomy and exploration of the common duct are avoided.

CARL J. DEPRIZIO

PRIMARY BILIARY CIRRHOSIS: OBSERVATIONS ON THE NATURAL COURSE OF THE DISEASE IN 25 WOMEN: F. W. Hoffbauer. Am. J. Digest. Dis. 5:348-383 (April), 1960.

The disease lasted from 2 to 18 years (average 8 years) in 20 fatal cases. In the patients still living the disease has existed from 3 to 11 years. The relentless course of the disease was not influenced by any therapeutic measure employed.

WALTER CANE

OBSERVATIONS CONCERNING THE SIGNIFICANCE OF FATTY AND FIBROUS TISSUE IN NEEDLE BIOPSIES OF THE LIVER: Robert J. Hartsock and Edwin R. Fisher. Am. J. Med. Sc. 239:445-452 (April), 1960.

The authors review the two previous reports dealing with long-term serial studies for determination of histologic changes occurring in patients known to have fatty livers. This series of 16 male veterans are followed by needle biopsy for from one to five years. The average interval was 2.4 years. The fatty and fibrous changes within the liver as revealed by needle biopsy appeared to be correlated with the patient's alcoholic and nutritional status. Seven patients had exhibited no change, six showed a quantitative increase, and in three, an actual decrease was observed.

BERNARD FARFEL

UNUSUAL CLINICOPATHOLOGICAL SYNDROMES WITH KAPOSI'S VISCERAL AND RELATED SARCOMATA: Henry T Perkins, Jr., John V. Verner, Tatsuo Yoneyama and E. Harvey Estes. A.M.A. Arch. Int. Med. 105:733 (May), 1960.

Three cases of Kaposi's disease are reported with predominance of visceral involvement. One patient showed a rapidly progressing hepatosplenomegaly with loud continuous bruit over these organs and symptoms of arteriovenous shunts. Involvement of heart, bones and mediastinum indicated a systemic disease. There was no skin involvement. The course was fulminating. The diagnosis was made at autopsy. The other patient had likewise marked hepatomegaly. Only one of them had typical skin changes. Kaposi's sarcoma must be included in the differential diagnosis of obscure visceral diseases especially those associated with hepatosplenomegaly. The disease is resistant to any therapy. However, there may be spontaneous temporary regressions.

H. B. EISENSTADT

POSTNECROTIC CIRRHOSIS WITHOUT ANTECEDENT ACUTE LIVER DISEASE: Arthur S. Weissbein and Norman M. Scott. A.M.A. Arch. Int. Med. 123:71 (July), 1960.

Postnecrotic cirrhosis is believed to be connected etiologically with infectious or homologous serum hepatitis, with liver intoxication, or with malnutrition. The increased frequency of this disorder recently observed has been attributed to an increased incidence of hepatitis during the previous wars. In order to evaluate the association between hepatitis and postnecrotic cirrhosis, 22 persons with the latter disorder, proven by biopsy or autopsy, were carefully investigated for a previous history of infection, intoxication, or malnutrition. Sixteen of the group failed to show any of these etiological factors. Therefore, the conclusion is drawn that even if some of them might have suffered from anicteric hepatitis in the past, the majority of patients must have suffered from postnecrotic cirrhosis of a yet undetermined cause.

H. B. EISENSTADT

PANCREAS

CARCINOMA OF THE PANCREAS ASSOCIATED WITH DIABETES MELLITUS: Charles H. Kravitz and William Menin. Pennsylvania M. J. 62:1332 (Sept.), 1959.

Four cases were presented of carcinoma of the pancreas associated with diabetes mellitus. Emphasis was made upon the existing statistical evidence in the literature that these two diseases are closely related.

It was noted that the pancreas is the most common site of malignancy in the diabetic as contrasted with the seventh position for carcinoma of this organ in the population at large. Further statistics were brought forth which indicated that not only is carcinoma of the pancreas more common in the diabetic but so is carcinoma of other organs.

One should be alerted to the possibility of the development of cancer of the pancreas in a diabetic when there is any significant alteration in the blood sugar level or general diabetic control which is not the result of lapses in management or of some complicating factor such as infection.

MORTON SCHWARTZ

ACUTE RENAL FAILURE AS A COMPLICATION OF ACUTE PANCREATITIS: William R. Beisel, E. G. Herndon, Jr., John E. Mayers, Jr. and Lyle Stones. A.M.A. Arch. Int. Med. 104:539 (Oct.), 1959.

The occurrence of acute "lower nephron nephrosis" as a complication of hemorrhagic pancreatitis has been frequently overlooked. Transient oliguria and prerenal azotemia may occur without serious renal damage due to hypotension or dehydration. However, if oliguria persists in spite of correction of these factors renal failure is present. Prognosis of this complication is poor but may be improved by hemodialysis. Elevated serum amylase may occur in acute or chronic insufficiency without pancreatitis. However, these cases present usually a different clinical picture. In hemorrhagic pancreatitis the serum amylase will fall rapidly after initial elevation in spite of persisting severe oliguria.

H. B. EISENSTADT

CALCIFYING PANCREATITIS WITH DUCT OBSTRUCTION AND HYDROPANCREATOSIS. EOSINOPHILIC PLEURAL EFFUSION: P. Langeron, A. G. Prevost and H. Oudar. Presse Medicale 67:2131 (5 Dec.), 1959.

This study reports the observation on a 30-year old man who had undergone in 1956 a gastroenterostomy for an ulcer of the 2nd part of the duodenum and developed a right serofibrinous pleurisy in January, 1958. This patient was admitted to the hospital in September 1958 for digestive derangement and left pleural effusion: it was an eosinophilic pleurisy. He was treated with corticoid drugs and during this treatment there arose an acute, painful, abdominal attack that brought about the diagnosis of ulcer perforation. The operation showed that the source of the attack was pancreatic with lack of hyperamylase. The pancreatic disease was proven by the appearance of pancreatic calcifications on an abdominal radiograph without preparation. Later a left hemipancreatectomy was performed followed by a pancreatojejunostomy on excluded intestine loop.

The arrival of a pancreatic attack during corticotherapy constitutes a paradoxical fact that can be explained in this particular case by the essentially mechanical character of the pancreatic disease. There was a Wirsung duct obstruction through many lithiasis concretions and retention of pancreatic juice in a cystic cavity (hydropancreatosis) without any seat of parenchymatous necrosis. Thus, the lack of hyperamylase can be expained too.

The course of the disease brings about in this case a relation between the pancreatic trouble and the eosinophilic pleural effusion. Facts of this kind are very few. In this case they are doubtless explained by the importance of loco-regional disorders due to the acute distention of the pancreas excluding any enzymatic factor. Attention must also be called to the eosinophilic character of the effusion perhaps due to the function of eosinophils regarding histamine (released through the excitation of the solar plexus).

GUY ALBOT

CHRONIC PANCREATITIS: R. F. Jones, R. Clements, C. C. Pearson, L. D. Hill and C. S. Stone, Jr. A.M.A. Arch. Int. Med. 105:320 (Feb.), 1960.

Chronic pancreatitis is associated with biliary tract disease and alcoholism, intraductal obstruction, trauma, hypercholesterolemia, hyperparathyroidism and malnutrition. Hereditary, toxic, vascular and infectious factors may contribute to the disease. Symptoms are pain, vomiting, jaundice, weight-loss, steatorrhea, diabetes and epigastric mass. Abnormal laboratory tests: Elevated serum amylase and lipase; hyperglycemia; hypocalcemia; glycosuria; elevated urine amylase; decreased volume and bicarbonate during secretin test; low carotene; abnormal Vitamin A tolerance test; reduced radioiodine absorption after ingestion of tagged triolein. Stool may contain increased fecal fat, increased fecal protein, increased tagged triolein. X-ray may show calcifications, duodenal loop distortion, gallbladder and pancreatic stones, cystic mass. Medical treatment: Anticholinergics, antacids, insulin, pancreatic extracts, analgesics, diet, avoidance of alcohol. Surgical management: Cholecystectomy, choledochotomy, sphincterotomy, excision of cysts and stones, vagotomy, subtotal gastrectomy, gastrojejunostomy, choledochojejunostomy, drainage of cysts, pancreatojejunostomy, partial and total pancreatectomy.

H. B. Eisenstadt

PATHOLOGY AND LABORATORY RESEARCH

GASTRIC HYDROCHLORIDE ACID SECRETORY RESPONSE TO ORALLY ADMINISTERED BETAZOLE HYDROCHLORIDE: Harry L. Segal, Charles R. Shepardson and George L. Plain. New England J. Med. 261:542 (10 Sept.), 1959.

Two separate groups of 14 people were studied for the gastric acid response to the administration of Histalog. One group was given 100 mg. of orally administered Histalog and 50 mg. of subcutaneously administered Histalog on two different days. The other group was given 50 mg. of oral medication and 50 mg. of subcutaneous medication on two separate days. The final results indicated that the orally administered compound in the human subject in a dose of 50 mg. is a potent gastric hydrochloride acid stimulant. The subcutaneous doses were more effective than the orally administered doses.

Side-effects consisted chiefly of flush reaction and a mild headache; the flushing occurring mainly after the 100 mg. dose given orally, and the mild headache occurred in only two of the 14 subjects.

The authors imply that the oral use of Betazole Hydrochloride is more effective than the use of caffeine as a gastric stimulant in the detection of achlorhydria by the tubeless gastric analysis.

Ezra J. Epstein

SALURETIC AND TOXIC EFFECT OF AMPHENONE IN A PATIENT WITH CIRRHOSIS AND ASCITES: Spellberg and Chaikoff. A.M.A. Arch. Int. Med. 104:396 (Sept.), 1959.

Aldosterone and adrenal hydroxycorticoids are inhibited by amphenone. In order to evaluate the role of the adrenal corticoids in the formation of ascites associated with hepatic cirrhosis amphenone in gradually increasing doses from 3 to 6 gm. daily was administered. There was a sharp rise of sodium excretion into the urine following the intake of this drug. However, there was no reduction of the ascites. This observation cast doubt on the theory that the formation of ascites depends on sodium retaining steroids. However, amphenone produced severe toxic symptoms especially drowsiness, ataxia and tremors. The latter differed from those of the flapping tremors of hepatic coma. In addition, this substance precipitated hepatic insufficiency and death.

H. B. Eisenstadt

SERUM CYANO-COBALAMIN (B_{12}) AS AN INDEX OF HEPATIC DAMAGE IN CHRONIC GONGESTIVE HEART FAILURE: A.M.A. Arch. Int. Med. 104:406 (Sept.), 1959.

It has been shown that liver cell damage is associated with marked increase of the Vitamin B_{12} blood level due to release of this vitamin from the damaged liver cells. In acute liver damage this change is marked but only temporary while the persistent elevation of B_{12} is observed in chronic liver diseases. A moderate to marked increase occurs also in passive congestion of the liver. The longer the heart failure persists the more marked is the elevation of the vitamin contents of the serum. In contrast the common liver function tests – including the serum transaminase – are normal in passive congestion of the liver.

H. B. EISENSTADT

STUDY ON URINARY LIPASE: Martin M. Nothman and Allan D. Callow. A.M.A. Arch. Int. Med. 104:568 (Oct.), 1959.

Twenty-four persons, some of them patients with hepatic pancreatic disease, others normal controls, received an intravenous injection of 100 units of secretin, Lilly. The urinary lipase concentration was determined before and for 24 hours after this injection. In normal persons the value of urinary lipase is less than 0.75 units. Two hours after injection of secretin the urinary lipase rises and reaches its peak after about 6 to 8 hours to a value of 1.8 units. In pancreatic carcinoma there is a low urinary lipase concentration present that does not increase or might even decrease after secretin injection. In chronic pancreatitis the basic level of urinary lipase is normal, however, there is also no response to secretin.

H. B. EISENSTADT

THROMBOPLASTIN GENERATION AS A TEST OF LIVER FUNCTION: S. Fred Rabiner and Theodore H. Spaet. Am. J. M. Sc. 238:280-286 (Sept.), 1959.

The Serum Thromboplastin Generation Test (STGT) was used as a test for liver damage. Where liver damage was suspected but not proven by abnormalities in standard liver function tests, the STGT often was abnormal. However, some with abnormal standard liver function tests gave normal results in the STGT. The abnormality is believed to be compatible with Factor X deficiency. The STGT is suggested as being of possible value as a liver function test.

BERNARD FARFEL

DISTURBANCES OF DIGESTIVE PHYSIOLOGY FOLLOWING ACUTE DRINKING EPISODES IN "SKID ROW" ALCOHOLCS: Melvin Small, A. Longarini and N. Zamcheck. Am. J. Med. 27:575 (Oct.), 1959.

A study of the digestive system of skid-row alcoholics at the termination of a drinking episode revealed varying degrees of physiologic disturbance of one or more of the digestive organs. These functional alterations were usually minor and were frequently transient. The disturbances noted were: 1. reductions in gastric hydrochloric acid; 2. variations in urine uropepsin values above and below normal; 3. increases in serum lipase and amylase suggestive of subacute pancreatitis; 4. hepatomegaly accompanied by minor and transient alterations of liver function tests; 5. transient minimal deficits of gallbladder filling and emptying, and 6. frequent abnormalities in the tests for intestinal absorption of xylose and potassium iodide.

JOHN M. MCMAHON

RESEARCH ON FATTY LIVER DUE TO POISONING BY VOLATILE ORGANIC COMPOUNDS: IV. A BIOCHEMICAL AND HISTOCHEMICAL STUDY OF FATTY LIVERS CAUSED BY TRICHLORETHYLENE: J. Verne, P. F. Ceccaldi, S. Hebert and J. M. Roux. Pathol. & Biol. 7:2311 (Nov.), 1959.

The results of the experimental study presented by the authors show that trichlorethylene, unlike chloroform and carbon tetrachloride, does not provoke any necrosis of the hepatic cells: an excess of intracellular lipids is observed which is all the more marked the longer is the action of the product, this being accompanied by the disappearance of glycogen and a rarefaction of cytoplasmic ribonucleic acid. This excess is still glyceridic and affects almost only free lipids.

Differential centrifugation shows that the microsomes alone are abnormal, and show a slight storing of glycerides and a decrease in phosphatides. The product used by the authors was chemically pure and "non-technical" and it would be interesting to establish what substance is responsible for the toxicity observed in intoxications produced by industrial trichlorethylene.

GUY ALBOT

A SURVEY FOR HEMAGGLUTININS IN VIRAL HEPATITIS: R. W. McCollum, V. Bech, P. Isacson and J. T. Riordan. Am. J. Med. 27:703 (Nov.), 1959.

The authors have assessed 2 recently described agglutination tests for their possible value in studies concerned with human viral hepatitis. The rhesus erythrocyte agglutination test was not found to yield sufficiently significant results to make it a useful test. On the other hand, the chick-cell agglutination test, using acetone-ether extracted serum, gave results which showed a striking contrast between patients with viral hepatitis and those with a variety of other diseases or "normal" control subjects. Serums from patients with obstructive jaundice or drug-induced jaundice were uniformly negative.

The nature of these agglutinins is not clear, but their pattern of occurrence and mechanism of action deserve continued exploration.

JOHN M. MCMAHON

THE PORTAL CIRCULATION IN ADULT MYXEDEMA: V. Gilsanz, M. Gallego and A. Vergara. A.M.A. Arch. Int. Med. 105:252 (Feb.), 1960.

In order to determine circulatory alterations in hypothyroidism in the abdomen five patients with typical myxedema received hepatic biopsies, splenoportography, determination of splenic pressure and spleen-lung ether circulation time estimation. The latter measures the time interval between injection of ether into the spleen and its appearance in the breath. These investigations showed a delayed portal circulation which was proportional to that of the general circulation. The venous pressure of the spleen was diminished similar to that of the antecubital vein. The oxygen saturation of the splenic blood was below normal. Hepatic biopsies revealed little structural abnormalities, just some increase of liver glycogen. All abnormalities reverted to normal after specific therapy.

H. B. EISENSTADT

BIOPSY OF THE NORMAL INTESTINE: G. Astaldi and E. Strosselli. Am. J. Digest. Dis. 5:175-212 (March), 1960.

The paper is translated and reprinted from the Italian. It is outstanding in several respects. The authors present the subject thoroughly and systematically. They contribute new and valuable information. Their histological illustrations, partly in color, are clear and instructive. The authors used the intraluminal intestinal biopsy capsule developed by Crosby and Kugler in their two-year long study of normal jejunal mucosa of humans. They report on the microscopic anatomy ranging from the *muscularis mucosae* to the columnar epithelium of the villi. The many mitoses seen in the crypts are potential starting points for future researchers studying mi-

totic activity of intestinal epithelium under the effect of antimitotic agents, antimetabolites, antibiotics, and sulfonamides. The authors also present the results of interesting histochemical tests and have demonstrated pigment granules hitherto undescribed.

WALTER CANE

LEUCINE AMINOPEPTIDASE: SIGNIFICANCE OF SERUM ELEVATIONS IN DISEASE OF THE HEPATO-BILIARY-PANCREATIC SYSTEM: Harry Shay, D. C. H. Sun and H. Siplet. Am. J. Digest. Dis. 5:217-233 (March), 1960.

Serum LAP values and liver function profiles were determined, often serially, in patients with carcinoma of the pancreas with and without jaundice as well as in patients with jaundice due to other causes. From their observations the authors suggest that elevations of S-LAP as they are related to disease of the hepato-biliary-pancreatic system are due entirely to changes in the liver or biliary tract.

WALTER CANE

AN EFFECTIVE TREATMENT OF REFRACTORY ASCITES IN CIRRHOSIS OF THE LIVER: Allan G. Redeker, Oliver T. Kuzma and Telfer B. Reynolds. A.M.A. Arch. Int. Med. 126:594 (April), 1960.

In order to test the effect of steroids on ascites formation 18 patients with cirrhosis of the liver and intractable ascites received 4 mg. of Medrol, t.i.d. These patients were taking a diet with a sodium restriction of 300 mg. per day and 2 gm. of Diuril. The sodium excretion of the urine was determined with a flame photometer. Medrol alone had no effect on the sodium excretion. Diuril produced an average excretion of 3 mEq. of sodium per 24 hours. The concurrent administration of Diuril and Prednisolone resulted in an excretion of 76 mEq. per 24 hours in 15 of the patients. Three of the 18 patients were resistant to this therapy. Potassium excretion was considerable at the same time. An average of 116 mEq. of potassium was eliminated during 24 hours. Aldosterone excretion decreased. No serious complications were seen resulting from the combination of the two drugs except an acute duodenal ulcer and a staphylococcic abscess in one of the patients. No refractoriness to the treatment developed over a long period of time. In a few the dose of Medrol had to be increased from 3 to 4 tablets daily.

H. B. EISENSTADT

HEPATOCELLULAR JAUNDICE AS A COMPLICATION OF IPRONIAZID THERAPY: L. E. Rosenblum, R. J. Korn, Hyman J. Zimmerman. A.M.A. Arch. Int. Med. 105:583 (April), 1960.

Iproniazid, an amine oxidase inhibitor, has been extensively used for the treatment of mental depression. Minor side-effects of the drug included neurologic, gastrointestinal and genitourinary symptoms. However, the most serious complication is jaundice. Ninety patients developing jaundice while receiving iproniazid were studied. Sixty-three of them were females. The shortest period of continuous treatment was four days, the longest six months before jaundice appeared. The total dosage varied from ½ to 10 gm. All liver function tests, especially thymol turbidity, cephalin flocculation and alkaline phosphatase and SGOT levels indicated hepatocellular damage. Liver biopsy or autopsy showed diffuse cellular necrosis, necrobiosis, collapse of stroma and inflammatory infiltration. Twenty of the 90 patients available for study died. Jaundice associated with iproniazid resembles that of infectious hepatitis, but is much more severe and carries a much poorer prognosis.

H. B. EISENSTADT

HEMOCHROMATOSIS AND HEMOSIDEROSIS: Richard A. MacDonald and G. Kenneth Mallory. A.M.A. Arch. Int. Med. 105:686 (May), 1960.

Hemachromatosis is usually ascribed to an inborn error of iron metabolism. Lack of normal mucosal block for the absorption of iron has been suggested as a cause of

this condition and attributed to genetic factors. This assumption is based upon the observation that hemachromatosis may affect several members of the same family. However, it is known that classical hemochromatosis is difficult to separate from severe hemosiderosis following excessive administration of iron, or associated with various forms of anemia, not treated with iron overdosage. In spite of various clinical tests such as liver biopsy, bone marrow and skin examination, urinary sediment stain and serum iron determination the diagnosis of hemochromatosis can only be verified by autopsy on the basis of portal cirrhosis, excessive iron deposits in the hepatic parenchyma, pancreatic fibrosis and hemosiderosis and parenchymal iron deposits in other organs of the body. Hemochromatosis has been separated from hemosiderosis on the basis of whether there is evidence of tissue damage. At autopsy, 211 cases of hemochromatosis and hemosiderosis were studied to elucidate the cause and relationship of these two conditions. Most of the patients were white males. Nearly all were manual workers and employed in low income jobs. The majority showed a history of either alcoholism or malnutrition, or had autopsy findings suggesting either of these conditions. Only 10 patients gave a history of an excessive number of blood transfusions. The development of carcinoma, the presence of pancreatitis and diabetes, jaundice, melanoderma, ascites, esophageal varices and cholelithiasis could not be used to distinguish hemochromatosis from hemosiderosis. On the basis of these observations the concept that hemochromatosis represents an inborn error of iron metabolism is questioned. The cause seemed to be dietary deficiency and malnutrition rather than genetic defect. There are no essential differences between hemosiderosis and hemochromatosis.

H. B. EISENSTADT

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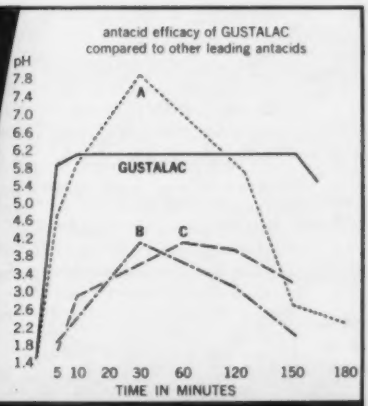

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BOOK REVIEWS FOR GASTROENTEROLOGISTS

THE PHYSIOLOGY AND TREATMENT OF PEPTIC ULCER: J. Garrott Allen, Editor. Contributors: Charles B. Clayman, Robert V. DeVito, Henry N. Harkins, Paul C. Hodges, Joseph B. Kirsner, John H. Landor, Harry A. Oberbelman, Walter L. Palmer, Stanley B. Rigler, Edward H. Storer and Edward R. Woodward, 236 pages, illustrated, The University of Chicago Press, Chicago, Ill., 1959. Price $7.50.

The book is dedicated to Lester R. Dragstedt in recognition of his contribution to the field of gastrointestinal physiology and surgery.

Physicians will greatly benefit in reading this volume because of the lucid explanation of the physiology of gastric secretion, and the newer concept of the pathogenesis of peptic ulcer and the differentiation between gastric and duodenal ulcers.

Both the text and illustrations are superb, the contributors are clinicians and have expressed the views in a clear and concise manner. The reviewer recommends careful reading of the text on page 207, "Small Ulcerative Lesions in the Stomach: Benign or Malignant?".

An extensive bibliography after each chapter and cross index are additional features. It is a worthwhile addition to the physician's library.

TEMOS ESCODIGOS DE GASTROENTEROLOGIA—Vol. III: 507 pages, illustrated, Sociedad Colombia de Gastroenterologia, Bogota, Colombia, 1959.

Published under the auspices of the Gastroenterological Society of Colombia of which Dr. Alberto Albornoz-Plata was president, this volume is a compilation by members of that organization in addition to postgraduate courses given by Drs. Garlock, Seymour Gray, Franz Ingelfinger, Monaghan and Sepulveda.

It is an excellent review of gastroenterology, and physicians who read Spanish will find much new and instructive material in its pages.

KLINISCHE RADIOLOGIE DES MAGENS UND DES ZWOLFFINGERDARMS: Dr. Pierre Porcher, Paris, Dr. Hans-Uhlrich Stossel, Bern, und Dr. Paul Mainguet, Brussel, with a foreword by Professor Dr. Med. H. H. Berg, Hamburg, 264 pages, 260 illustrations, Georg Thieme Verlag, Stuttgart, Germany, 1959. Price $17.15.

An excellent text with beautiful roentgen illustrations and explanations, an extensive bibliography and index.

The step-by-step technic for examination of the esophagus and stomach and the use of morphine and/or atropine to better visualize, to relieve spasm and thus bring out lesions of the stomach and duodenum which were not seen in the routine examination. In the opinion of the reviewer, the use of morphine should be relegated to patients who are hospitalized and where more time can be given for studying the patient. Atropine, however, unless contraindicated, may be used in office procedure.

On page 225 the authors discuss roentgen cinematography with numerous illustrations showing the emptying of the stomach.

The text is clear, concise, the illustrations are excellent. An extensive bibliography and cross index complete the book.

DISTURBANCES IN GASTROINTESTINAL MOTILITY, DIARRHEA, CONSTIPATION, BILIARY DYSFUNCTION: Edited by J. Alfred Rider, M.D., Ph.D., Assistant Professor of Medicine, University of California School of Medicine, San Francisco, Calif., 387 pages, illustrated, Charles C Thomas, Publishers, Springfield, Ill., 1959. Price $13.00.

The list of contributors alone are a mark of distinction, and add greatly to the value of the book. The panel discussions are interesting and instructive.

The chapter on Biliary Dyskinesia, newer methods of diagnosis and treatment by Rose, Senior Surgeon, New Castle General Hospital, England, is excellent and is rec-

ommended to be read by physicians. Gordon McHardy contributes a chapter on postcholecystectomy syndrome. The symposium on ulcerative colitis by Bargen, and panel members, as well as newer drugs in the therapy of constipation by Steigmann of Chicago are excellent additions to disturbances in gastrointestinal motility. Functional indigestion by Alvarez, and postgastrectomy syndromes by Rider, plus the pathogenesis and treatment of acute dilatation of the stomach and paralytic ileus by Dragstedt complete the monograph. In addition there is a general question and answer panel on page 383, which makes interesting reading.

All in all, it is well written, illustrated and has a fairly extensive bibliography, but lacks an index. It is, however, wide in scope and makes good reading.

XYLOCAINE, THE PHARMACOLOGICAL BASIS OF ITS CLINICAL USE: Sten Wiedling, The Research Laboratory of A. B. Astra, Sodertalje, Sweden, 139 pages, Almqvist & Wiskell, Stockholm, 1959.

The author attempts to show the use of Xylocaine as an anesthetic agent in various conditions which require either local anesthesia or as a blocking agent. In investigations conducted on dogs, it was shown that Xylocaine differs from procaine in its effect on the blood pressure. With Xylocaine no such change in the mode of reaction was observed.

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1. *British Medical Journal* 2:827, 1955
2. *American Journal of Gastroenterology* 28:439, 1957

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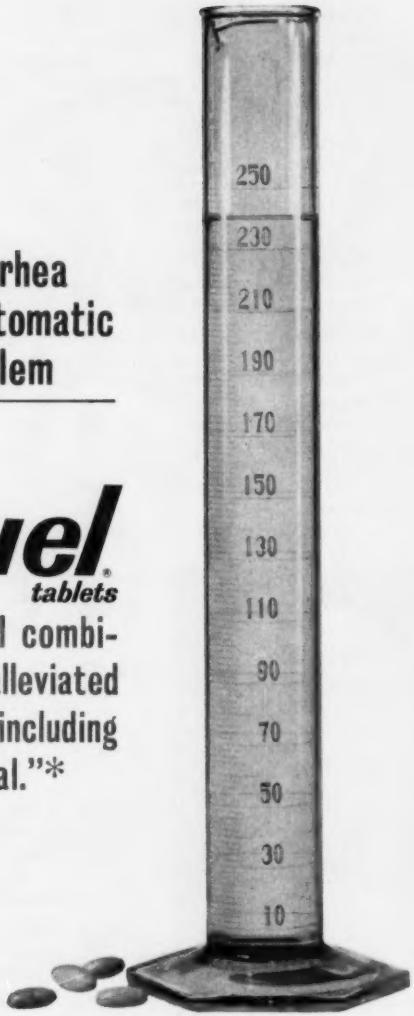

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side effects: The incidence of side effects at recommended dosage is negligible. (The usual precautions when using parasympatholytic agents should be observed.) COMPLETE INFORMATION REGARDING THE USE OF SORBOQUEL TABLETS IS AVAILABLE ON REQUEST.

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*Winkelstein, A.: Am. J. Digestive Dis. 34:524 (Nov.) 1960. additional bibliography: Hock, C.W.: Med. Times 88:320 (March) 1960. Hock, C.W.: Am. J. Digestive Dis. (Nov.) 1960. Berkowitz, D.: Am. J. Digestive Dis. (Nov.) 1960. Seneca, H.: Am. J. Digestive Dis. (Nov.) 1960. Gilbert, A. S.; Schwartz, I. R., and Matzner, M. J.: Am. J. Gastroenterol. (Dec.) 1960. Gilbert, S. S.: Am. J. Digestive Dis. (Nov.) 1960. Pimparker, B. D.; Paustian, F. F.; Roth, J. L. A., and Bockus, H. L.: Gastroenterology, to be published. Roth, J. L. A.: Am. J. Digestive Dis. (Nov.) 1960. Grossman, A. J.; Batterman, R. C., and Leifer, P.: J. Am. Geriat. Soc. 5:187 (Feb.) 1957. McHardy, G.; Browne, D.; McHardy, R.; Bodet, C., and Ward, S.: Am. J. Gastroenterol. 24:601 (Dec.) 1955. McHardy, G.: Am. J. Digestive Dis. (Nov.) 1960. Bercovitz, Z. T.: J. Am. Geriat. Soc. 5:940 (Nov.) 1957. Reports to the Medical Department, White Laboratories, Inc.

***fast action* 2**

FOR TOO FREQUENT EVACUATIONS:
the superior, yet selective, nonopiate action of thihexinol methylbromide produces prompt and prolonged intestinal motor inhibition. With SORBOQUEL, "the demonstrated inhibition of jejunal motility without a marked delay of gastric emptying is remarkable. In our experience, such selective depression of enteral motor activity has not been produced by other anti-peristaltic drugs."*

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CARBAMINE®

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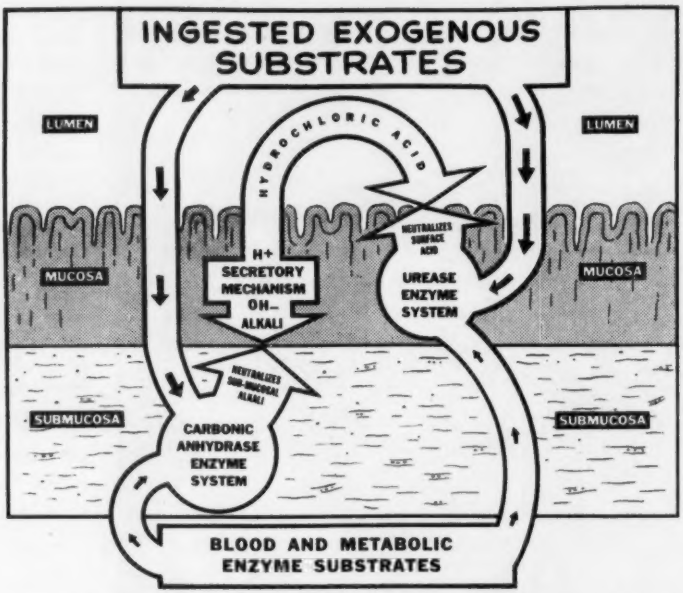

Enzymic imbalance resulting from insufficient substrates may lead to peptic ulcer and other digestive disorders (full discussion in article by Goodfriend, Vanderkleed and Goodfriend). Carbamide has been designed to supply substrates for these enzyme systems, and thus aid in relieving symptoms, correcting acid-base equilibrium, aiding mucosal healing and normal digestion, and restoring homeostasis.(1)

The action of Carbamine medication as a direct approach to the elevation of the health status and resistance of gastrointestinal mucosa; its high degree of therapeutic effectiveness; and its complete absence of toxicity or side-effects indicates that it is an important contribution to the materia medica of peptic ulcer and certain other gastrointestinal diseases.(2)

FORMULA:
Carbamide with citric acid and sodium bicarbonate to produce sodium citrate and carbon dioxide when dissolved in water.

DOSAGE:
One packet T.I.D. after mealtime and one packet at bedtime.

REFERENCES:

(1) Goodfriend, Vanderkleed & Goodfriend. "Enzymatic Therapy of Peptic Ulcer and Digestive Disorders." American Journal Gastroenterology, Vol. 33, No. 1, Pgs. 80-89, January 1960.

(2) Kelly, H. T., M. D., "Treatment of Gastroduodenal Ulcer and Certain Digestive Disorders with Mucosal Enzyme Substances", American Journal of Gastro., Vol. 33, No. 12, December, 1960.

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intensified by
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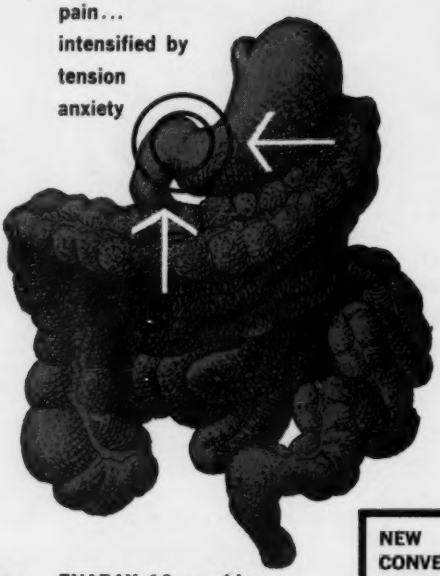

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the tranquilizer
that does not stimulate
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Oxyphencyclimine HCl .....5 mg.
ATARAX (Hydroxyzine HCl) ...25 mg.

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Supplied: Bottles of 60
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Proven effective for continuous relief of both physical and emotional aspects of G.I. disease — hypermotility, hyperacidity, and hyperemotivity. One tablet b.i.d. provides 24-hour control of symptoms in peptic ulcer, gastritis, gastroenteritis, colitis, functional bowel syndrome, duodenitis, hiatus hernia (symptomatic), irritable bowel syndrome, pylorospasm, cardiospasm, biliary tract dysfunctions, and dysmenorrhea. ENARAX 10 has been successful in 92% of cases.[1-3] Let your G.I. patients profit from its dual, full-time therapeutic action.

Dosage: One ENARAX 10 tablet twice daily — preferably in the morning and before retiring. The maintenance dose should be adjusted according to the therapeutic response. Use with caution in patients with prostatic hypertrophy and only with ophthalmological supervision in glaucoma. **Supplied:** In bottles of 60 black-and-white scored tablets. Prescription only.

References: 1. Hock, C. W.: Am. J. Gastroenterol. 34:293 (Sept.) 1960. 2. Leming, B. H., Jr.: Clin. Med. 6:423 (Mar.) 1959. 3. Data in Roerig Medical Department files.

†brand of hydroxyzine

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in PEPTIC ULCER/HYPERCHLORHYDRIA

- suppresses gastric acid secretion at the parietal cell level
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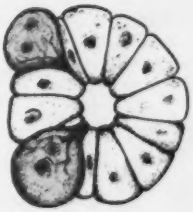
NACTON®...Has been shown to suppress gastric acid secretion for as long as 8 to 9 hours.[1] "...reduces the total output of gastric HCl by about 60%."[2] Decreases hypermotility of stomach and bowel.[3-7] Aids healing of peptic ulcer.[8] Unusually low incidence of side effects.[1,3,9]



Available as:
Tablets Nacton 4 mg.

References:

1. Douthwaite, A. H., and Hunt, J. N.: Effect of "Nacton" in Patients with Duodenal Ulcer, Brit. Med. J. *1*:1030-1034 (May 3) 1958. 2. Douthwaite, A. H.: The Development of the Treatment of Duodenal Ulcer, Proc. Roy. Soc. Med. *51*:1063-1068 (Dec.) 1958. 3. Steigmann, F.: The Problems of Side Effects in Anticholinergic Therapy, to be published. 4. Grossman, M. I., and Tuttle, S. G.: Clinical Report to McNeil Laboratories. 5. Texter, E. C.: Clinical Report to McNeil Laboratories. 6. Cayer, D., and co-workers: Clinical Report to McNeil Laboratories. 7. Lorber, S. H.: Clinical Report to McNeil Laboratories. 8. Walker, G. F.: Therapeutics: Gastric Sedatives, Brit. J. Clin. Pract. *13*:382 (May) 1959. 9. Douthwaite, A. H., Hunt, J. N., and MacDonald, I.: A Long-Acting Inhibitor of Gastric Secretion, Brit. Med. J. *2*:275-279 (Aug. 3) 1957.

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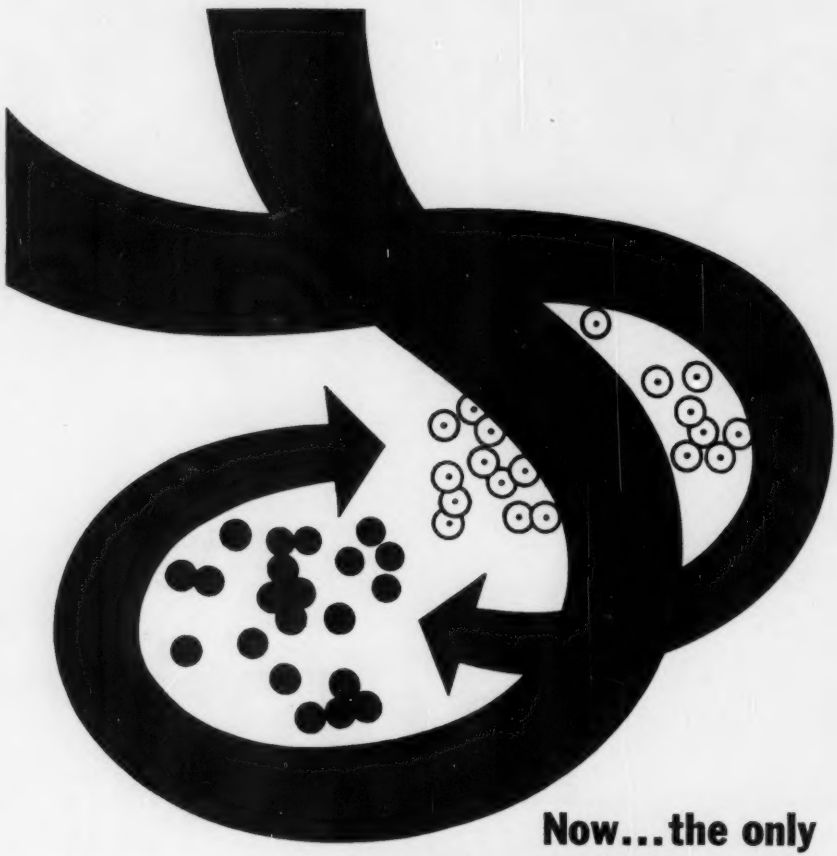

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CAPSULES, *150 mg. DECLOMYCIN Demethylchlortetracycline HCl and 250,000 units Nystatin.*

DOSAGE: *average adult, 1 capsule four times daily.*

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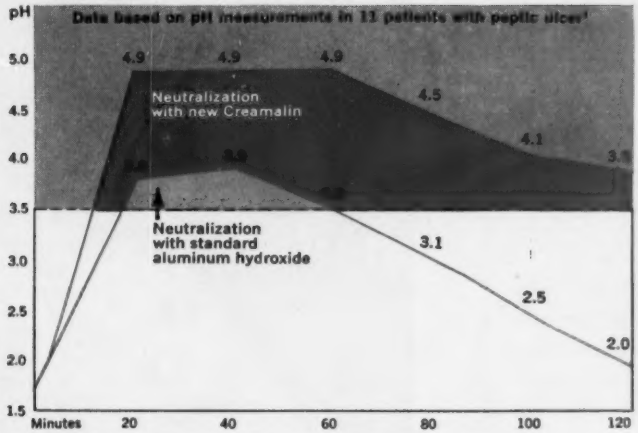
At the site of peptic ulcer

Following determination of basal secretion, intragastric pH was continuously determined by means of frequent readings over a two-hour period.



neutralization is much faster and twice as long with

New CREAMALIN® ANTACID TABLETS

New proof in vivo[1] of the much greater efficacy of new Creamalin tablets over standard aluminum hydroxide has now been obtained. Results of comparative tests on patients with peptic ulcer, measured by an intragastric pH electrode, show that new Creamalin neutralizes acid from 40 to 65 per cent faster than the standard preparation. This neutralization (pH 3.5 or above) is maintained for approximately one hour longer.

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Nonconstipating and pleasant-tasting, new Creamalin antacid tablets will not produce "acid rebound" or alkalosis.

Each new Creamalin antacid tablet contains 320 mg. of specially processed, highly reactive, short polymer dried aluminum hydroxide gel (stabilized with hexitol) with 75 mg. of magnesium hydroxide. Minute particles of the powder offer a vastly increased surface area for quicker and more complete acid neutralization.

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1. Data in the files of the Department of Medical Research, Winthrop Laboratories. 2. Hinkel, E. T., Jr.; Fisher, M. P., and Tainter, M. L.: J. Am. Pharm. A. (Scient. Ed.) 48:384, July, 1959.

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for peptic ulcer ■ gastritis ■ gastric hyperacidity

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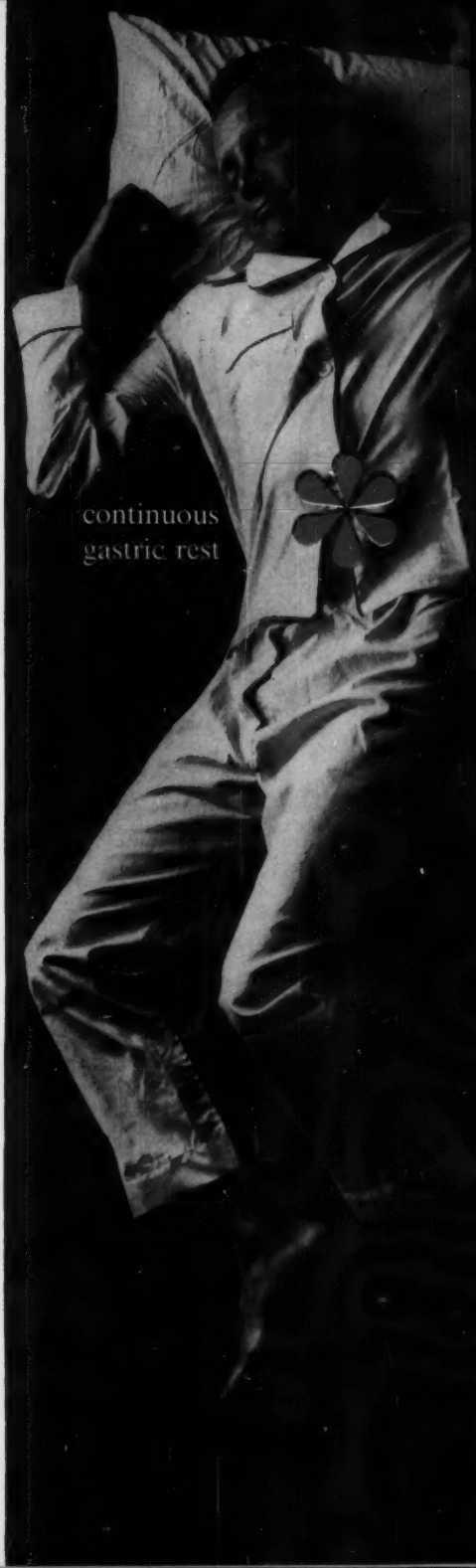
OXYPHENCYCLIMINE HYDROCHLORIDE

anticholinergic with staying power



***1 TABLET P. M.**
usually assures nightlong freedom from pain by providing prolonged and sustained (8-12 hours') anticholinergic action that *combats nocturnal increase* in the basal gastric secretion of peptic ulcer patients

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usually assures uninterrupted daytime control of gastric hypersecretion without dependence on the repeat doses required of shorter-acting anticholinergics

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CONTINUOUS * GASTRIC REST

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Side Effects and Precautions: Dryness of the mouth is the most common peripheral effect. Blurring of vision, constipation, and urinary hesitancy or retention occur infrequently. These effects may decrease or disappear as therapy continues, or can be minimized by adjustment of dosage. Care should be exercised in using DARICON in patients with prostatic hypertrophy, in whom urinary retention may occur. The use of DARICON as well as other anticholinergics in patients with an associated glaucoma is not recommended except with ophthalmological approval and supervision.

Administration and Dosage: The average adult dosage is 10 mg. of DARICON given twice daily—in the morning and at night before retiring. (Dosage should be adjusted in relation to therapeutic response.) As much as 50 mg. daily is acceptable to some adult patients. As little as 5 mg. daily is therapeutically effective in some adult patients.

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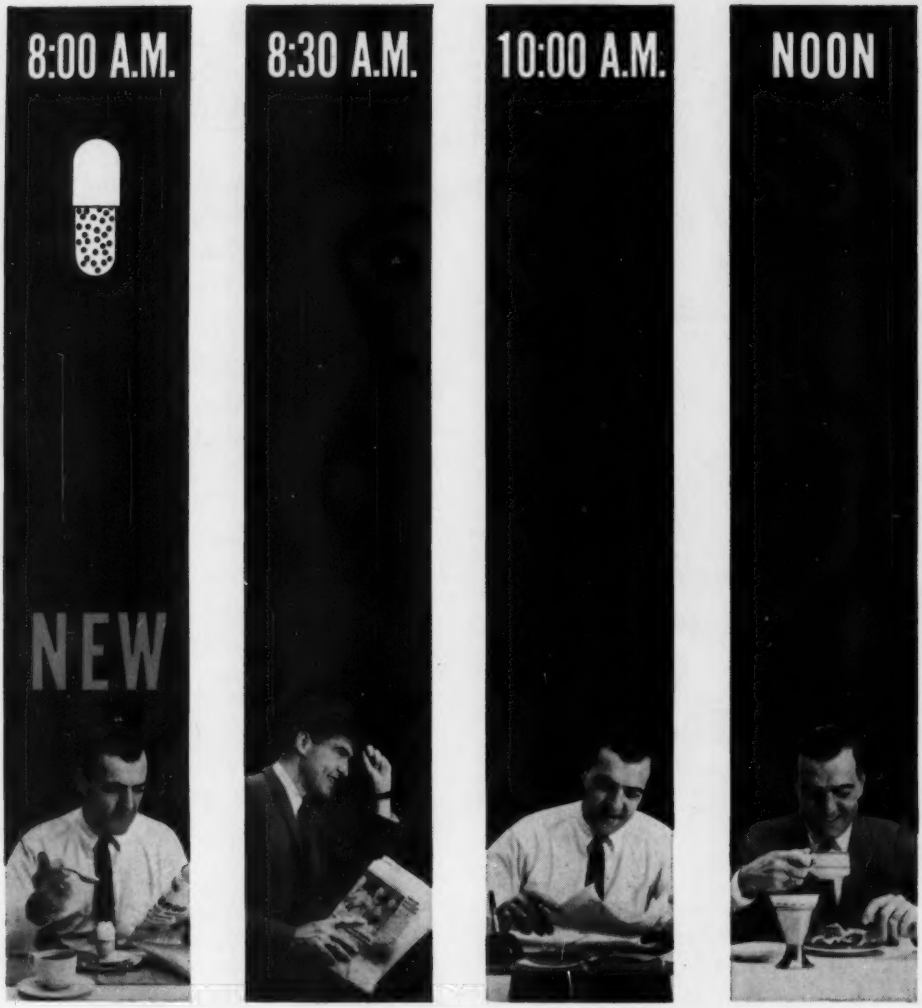

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the predictable, specific agent to
relieve anxiety and tension

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FORM OF EQUANIL

The average adult daily dose is 1 capsule twice a day although a dosage range up to 2 capsules twice a day may be required by certain patients. Supplied: 400 mg. capsules.

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For the irritable G.I. tract

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AVAILABLE IN TWO POTENCIES

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Bottle of 50.

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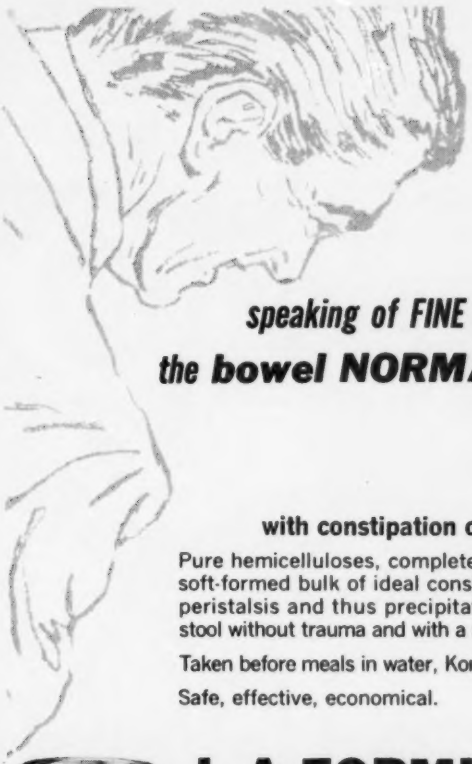

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Pure hemicelluloses, completely calorie-free, producing a soft-formed bulk of ideal consistency to stimulate normal peristalsis and thus precipitate easy passage of a bland stool without trauma and with a minimum of peri-anal soiling.

Taken before meals in water, Konsyl helps to depress appetite.

Safe, effective, economical.

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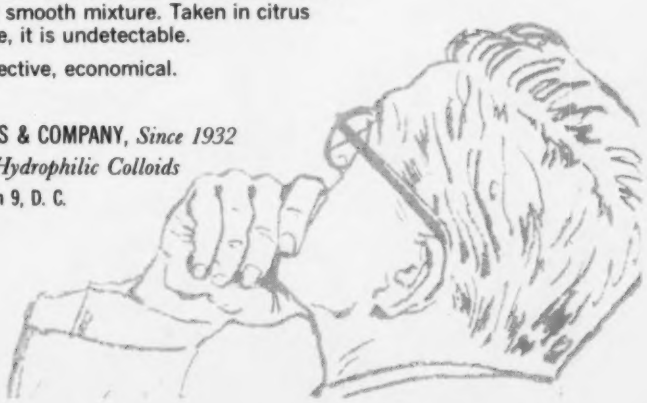

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